



ICI MAGAZINE

AUGUST/SEPTEMBER 1964



CONTENTS

- page 111 **ICIANZ** by J. R. A. Glenn
page 115 **Your health is their concern** by A. Lloyd Potter
page 119 **The brave days of St. Rollox** by Harry Hutchison
page 122 **Technology and higher education** by Trevor Owen
page 124 **British Nylon Spinners**
page 126 **The Great War**
page 127 **People and events**
page 134 **Gardeners' guide** by Percy Thrower
page 136 **Our man in Providence**
page 138 **The Gwyniad of Lake Bala** by Leslie Goode
page 140 **Pleasure in plants** by Eliot Hodgkin



J. R. A. Glenn



Leslie Goode



Eliot Hodgkin



Harry Hutchison



A. Lloyd Potter



Trevor Owen

CONTRIBUTORS

J. R. A. Glenn is chairman and managing director of ICIANZ, which he joined in 1935 as a works engineer. During the last war he played a major part in the design and construction of a number of chemical and explosives factories for the Commonwealth Government, then from 1944 to 1946 he was with ICI in Britain and North America, returning to Australia to become chief engineer of ICIANZ. He was appointed a managing director in 1953 and chairman last year. He is a member of the Council of Industrial Design of Australia and last April was appointed chairman of the committee to establish Melbourne's third university.

Leslie Goode is a photographer on the staff of the Mond Division Information Service. After working with the *Daily Mirror* and *Daily Mail* in Manchester he joined Dyestuffs Division, where he was engaged on photographic research, later moving to Winnington. A keen angler for many years, he spends as much of his spare time on the administrative side of fishing as he does with rod and line. He is a founder member of the Angling Section of the Winnington Park Recreation Club.

Eliot Hodgkin is ICI's deputy overseas controller, a post he has held since 1956. Extensive travel, first for the General Chemicals Division and since the war for the Overseas Department at Millbank, has always formed part of his work for the Company and has provided opportunities during longer tours abroad for the friendships through collecting rare plants that are mentioned in his article. He is a committee member of the Royal Horticultural and Alpine Garden Societies and has contributed articles to their bulletins.

Harry Hutchison has been Nobel Division publicity officer since 1951 and editor of *Nobel Times*, the Division newspaper, since its inception in 1955. He joined the Company in 1928 and worked for many years on the research side before moving over to publicity work in 1948. He is an occasional contributor to the Scottish press, with a bias towards articles on historical subjects.

A. Lloyd Potter is ICI's principal medical officer. After serving in the Royal Army Medical Corps throughout the war he decided not to return to his consultant practice in Lancashire but instead joined the former General Chemicals Division as a works medical officer. He became Division medical officer in 1948 and in 1960 moved to Head Office as principal medical officer, where his interest in industrial toxicology culminated in the building of the Company's new Industrial Hygiene Research Laboratories in Cheshire. Dr. Lloyd Potter was president of the Association of Industrial Medical Officers from 1961 to 1963.

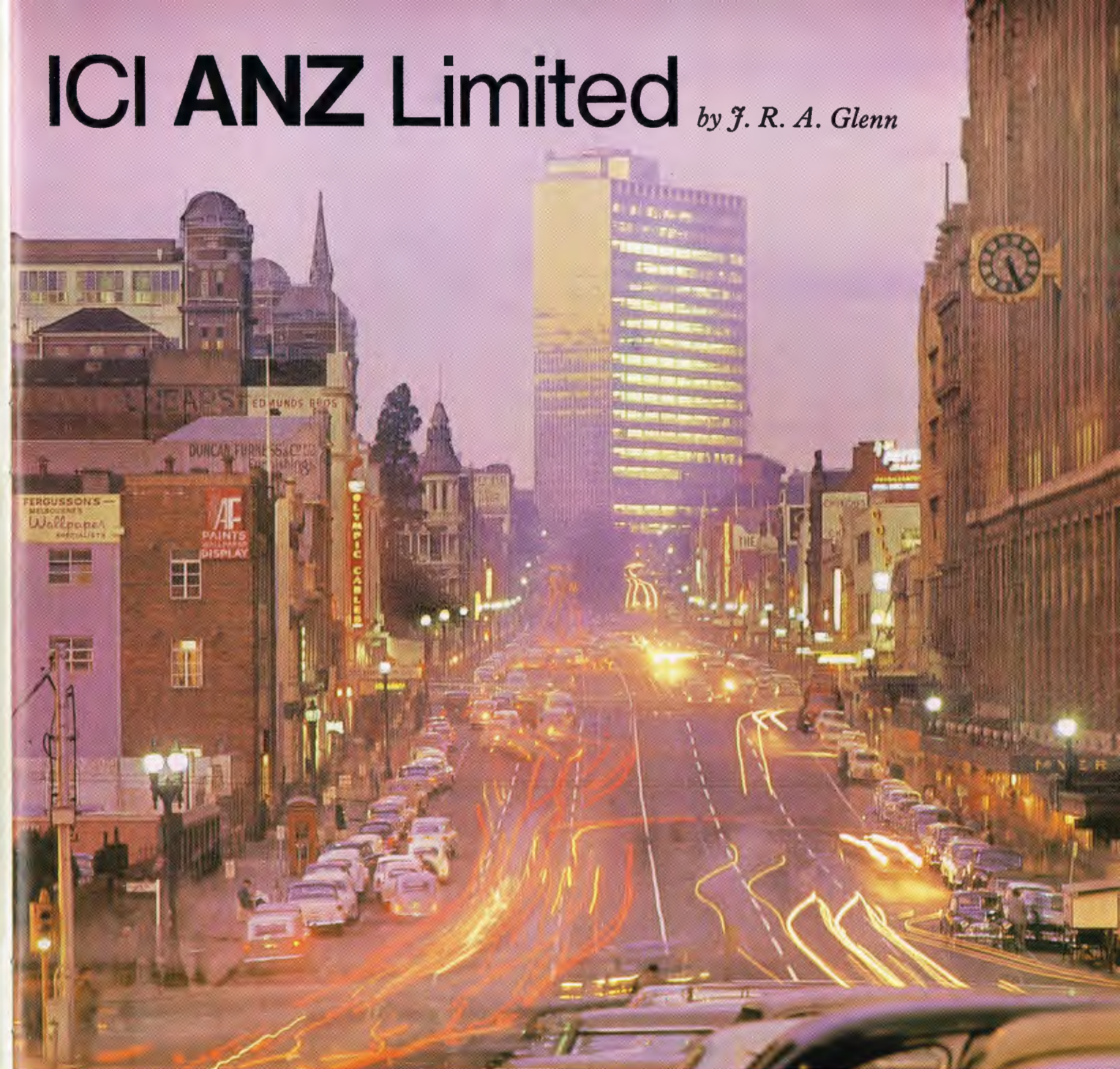
Trevor Owen joined the Company from Oxford University and, after a short spell as a trainee labour officer at Winnington, became a member of the Central Labour Department. When the Heavy Organic Chemicals Division was formed he became the Division's labour manager. He transferred to the Paints Division in 1959 as Slough Works personnel officer and became personnel manager of the Division in 1962.

Front cover: *Players fly high for a mark in the 1961 preliminary final of the Victoria Football League at the Melbourne Cricket Ground. The following week a record crowd of nearly 108,000 attended the grand final at this ground, scene of many famous test cricket matches. (Australian National Travel Association photograph)*

The *ICI Magazine*, price fourpence, is published every other month. It is printed by The Kynoch Press, Birmingham, and published by Imperial Chemical Industries Limited, Imperial Chemical House, Millbank, London S.W.1 (VICtoria 4444). The editor is glad to consider articles and photographs for publication, and payment will be made for those accepted.

ICI ANZ Limited

by J. R. A. Glenn



The traditional Christmas dinner complete with plum pudding, and this when the temperature outside is over 100 degrees Fahrenheit! Yes, Australians and New Zealanders have certainly inherited a great deal from British traditions and the British way of life despite the distance from the British Isles, the different climate, and the vastly different terrain.

The people of Australia are predominantly of British origin, but in the post-war period particularly there has been a large increase in migration from other parts of Europe, with all the new-

comers playing a vital part in developing the country.

Australia is a vast continent, about the same size as the USA, and to be associated with its development at this stage of its history is both exciting and challenging. The untapped mineral resources are an example of the challenge, and quite apart from the search for oil thirty major international companies have joined the mining invasion.

The sunshine has naturally stimulated a love of sport and outdoor activities, but it has not been to the exclusion of the

ICI House, Melbourne, Head Office of ICIANZ, dominates the city's northern skyline

other deeper interests. There is a flourishing theatre and general concern for literature and the arts. Names such as Joan Sutherland, Patrick White, Sidney Nolan and Robert Helpmann, to mention a few, are internationally famous.

Helpmann returned recently to direct the Australian Ballet Company in the world première of his ballet "The Display" at the Adelaide Arts Festival. Dame Margot Fonteyn and Rudolf Nureyev danced with the company in May, and 111

at the conclusion of her season Dame Margot said that the company included "magnificent soloists and fine young dancers." She forecast that it would probably rank among the world's finest in a few years' time.

From an industrial viewpoint it is often said that a nation's production of chemicals is a fair measure of its industrial strength and sophistication; and in Australia, where the chemical industry is growing at a greater rate than any other national industry, ICIANZ is in the vanguard of the rapid development taking place. Most important, and unlike many other Australian subsidiaries of large overseas companies, ICIANZ is accepted and recognised as being very much a part of Australia.

The second largest company in Australia, and the nation's largest chemical company, ICIANZ today is much changed since its inception in 1928, when the company was established to acquire the Australian business of the various concerns which two years previously had been merged to form ICI. At that time Mr. B. E. Todhunter was the ICI Director who played the leading role in the formation of ICIANZ. The parent company realised the wisdom of local participation in the ownership, and now there are more than 12,000 local shareholders, holding in total 40% of the company's shares.

When we began in 1928, the chief manufacturing activity carried on by ICIANZ through its subsidiary, Nobel (Australasia) Pty. Ltd., was the production of commercial explosives, and 'Nobel' is still the only producer of explosives in Australia.

By 1938 ICIANZ was making coated fabrics, slide fasteners, sporting ammunition and nitrocellulose. Expansion continued, and today we manufacture a comprehensive range of ICI products. Notable exceptions at the present time are dyestuffs, pharmaceuticals, and nylon and 'Terylene' polymers, although nylon and 'Terylene' fibres are in fact spun by an associated company, Fibremakers Ltd. Our interests in the paint industry are taken care of by BALM Paints Ltd., a 70% subsidiary of ICIANZ.

To serve these diversified interests our company is divided into six operational groups, organised along similar lines to the ICI Divisions, and each group is



The ski lodge built by members of the ICI ski club at Mt. Buller, Victoria. The lodge can accommodate 21 people

groups are supported by seven functional departments, and all operate from headquarters at ICI House in Melbourne. Sales offices are established in all capital cities, some of which are only 500 miles away, and others as much as 2000 miles from Melbourne. Fortunately we can move between them rapidly, as we have one of the world's best internal airline systems to link these places.

Our principal producing centres are at Sydney, Melbourne and Adelaide, but Brisbane will soon be added as a main production location. The oldest operating site we have is at Deer Park, near Melbourne, where commercial explosives were first produced in 1874. The largest concentration of plant exists on a site of 160 acres at Botany, near Sydney, no more than a stone's throw from Botany Bay, where the first white settlement was founded by Captain Phillip in 1788 and

where £A30 million is invested in the country's biggest single chemical complex. Factories are generally sited in industrial suburbs surrounding the capital cities, but many of our people travel as far as 20 miles each day to their jobs.

On the research and development side, ICIANZ is now becoming much more deeply involved and has more than 200 technical graduates working in this field—in fact the company is one of the few Australian private enterprise organisations with extensive research facilities.

Major ICIANZ research establishments are the Central Research Laboratories and Merrindale Station near Melbourne, the Botany Laboratory near Sydney, and the D'Aguilar research station 50 miles north of Brisbane in Queensland. Merrindale and D'Aguilar are probably the largest privately owned biological testing stations in the southern



The green-dyed crystallising ponds at the Dry Creek saltfields in South Australia. The dye, 'Solivap' Green, an ICI product, has the effect of trapping the sun's radiation and increasing the rate of evaporation by 20% Below: A horton sphere for ammonia storage at the new Ammonia Plant at Botany, N.S.W.

hemisphere, and they also carry out important work for ICI under semi-tropical and tropical conditions.

Some research is done on new products and processes, especially in those areas where we in Australia have particular needs or advantages, but most of our effort is directed towards improving existing products and processes, and often this involves adapting ICI research results to suit Australian conditions.

Development of the ICI herbicide diquat is a good example of total teamwork. It was at Ascot Vale that the method of synthesising the herbicide's active ingredient was greatly improved, and this was followed by joint research leading to the marketing of a product which, together with paraquat, is causing a minor revolution in farming methods. Australia's geographical location meant that, as part of this joint research effort, our botanists were able to carry out extensive trials in the Queensland canefields and conduct pasture renovation experiments under particular conditions.

In another branch of original research we were able to make a major contribution with what is called the flame ionisation detector. Developed by two scientists in our Central Research Laboratories, the detector is part of an instrument which analyses the composition of organic compounds with high sensitivity and speed, and already some twenty instrument companies, mainly in America and Britain, have become licensees of the invention.

The world's third largest saltfields, at Dry Creek in South Australia, give a typical illustration of how ICIANZ engineers and scientists adapted overseas know-how and developed new methods of construction and manufacture to provide the material so essential to the country's progress. There are no readily available deposits of rock salt in Australia, and so it was necessary to obtain salt by the solar evaporation of sea water. The ICI dye 'Solivap' Green, on which the basic development was done at Dry Creek, is used in the brine and improves





The ICIANZ Central Research Laboratories at Ascot Vale, Victoria

the rate of evaporation to more than 100,000 tons of water on a normal day. It is fascinating to watch the huge harvesting machines crawl crab-fashion over these immense crystallising areas lifting about 400,000 tons of salt each year for the production of alkalis at the nearby Osborne Alkali Works.

This research and development related to local raw materials assumes added national importance when considered from a defence and survival viewpoint. The isolation of Australia and New Zealand and their need to be self-sufficient were forcibly brought home during the last world war, when supplies of so many

Members of the Australian Ballet Company in a scene from "Jazz Spectrum," a new Australian ballet which was performed during the recent capacity tour by Dame Margot Fonteyn and Rudolf Nureyev. ICI 'Perspex' forms a large part of the set for the ballet

essential materials had to be imported. Today ICIANZ, along with a number of other Australian companies, has reached a point where the position has changed, and we have begun exporting to countries in Australia's near north.

As ICIANZ has become a senior member within the ICI group of companies, so it has assumed new responsibilities. Technical and other staff have been exchanged between ICIANZ and ICI for a number of years, but since 1960 engineers have also been seconded to ICI (India) to assist in that company's expansion. More recently we have had requests to supply commercial staff for Japan and Burma.

When Lord Fleck opened the company's new head office in Melbourne in 1958 he said: "No one spends £A3 million without giving the matter very careful thought, and a sum of that magnitude for a headquarters building has got to be earned."

This modern 22-storey structure standing on Eastern Hill overlooks the city. The cafeteria on the 18th floor provides a fine view of Melbourne and Port Phillip Bay, where the international liners berth. In Sydney the same ships also berth close to the company's office, which is itself in sight of the famous Harbour Bridge.

In both buildings great trouble has been taken to make working conditions pleasant, and we are justly proud of our fine collection of paintings by early and modern Australian artists.

In all, some 9,400 people are employed in ICIANZ offices and factories across Australia and New Zealand, and the company has a high reputation for providing good working conditions and facilities, including modern cafeterias, change-rooms, medical centres and recreation clubs. Joint consultation is encouraged through Works Councils and the Central Council.

People travel to work by bus, tram and train, but an increasingly large proportion travel by car. In Australia there is a car to every 3.5 people—a ratio which ranks fourth after the USA, Canada and New Zealand.

Social clubs flourish, and numbers of ICIANZ teams take part in district competitions in Australian Rules football, rugby, cricket, tennis, bowls, soccer—and yes, even darts. Australian Rules football has a larger following than any other sport in the country, and is a mixture of soccer, rugby and Gaelic football. The enthusiastic direction of the teams by onlookers would almost make the cries of your own Arsenal, 'Spurs or Chelsea supporters sound feeble.

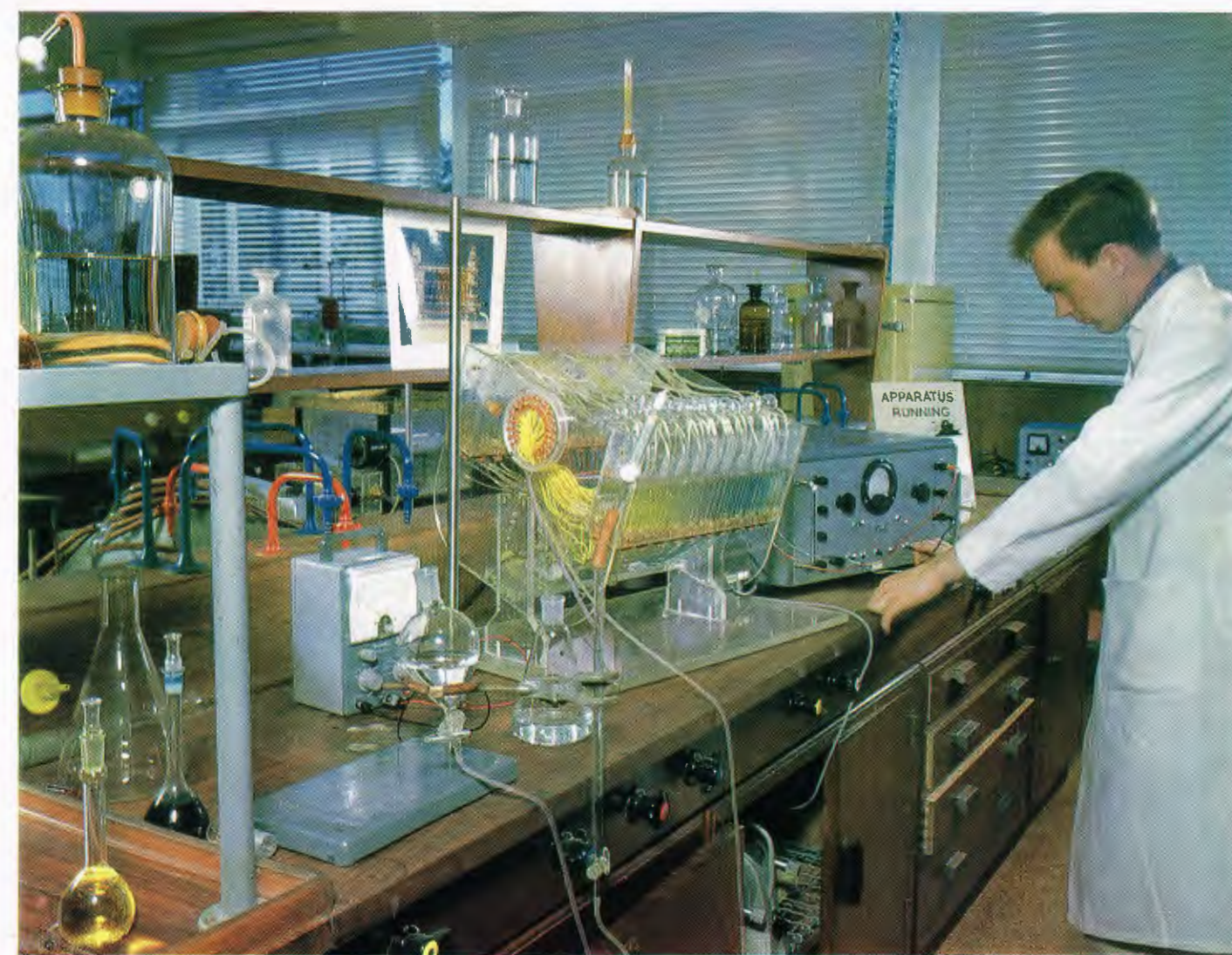
Participation in the "big leap forward" taking place in Australia, and seeing their company rise to a senior position in the ICI group, have moulded ICIANZ and its employees into a live, progressive organisation with a true sense of purpose, all of which was summed up recently by a financial writer in a leading weekly news journal when he spoke of "the remarkable efficiency and confidence emanating from ICIANZ."

Your health is their concern

by A. Lloyd Potter

Synthetic chemical substances enter more and more into our homes and our daily lives. We use them as weedkillers and as fertilizers in the garden and in and about the house as pesticides, detergents, cleaning fluids, hair lacquers, paint removers, and in a thousand and one other ways. They are added to the water we drink, the food we eat and the clothes we wear. As members of this Company we discover them, make them, use them, buy and sell them—and, most important, we put warnings when necessary on their labels.

Do you read labels and follow their instructions? Of course you do—everyone obeys the large signpost near the crossroads which states "Halt—major road ahead." Can the same be said about the small label on the bottle of fluid which is used to remove the greasy spots from a suit or a dress? How many people read it, and how many act on the warning to "avoid breathing the vapour and use only in a well-ventilated place"? Yet failure to do so can result in consequences quite as unpleasant if not so sudden and spectacular as failure to halt at a major road.



Counter-current ionophoresis machine under development in the Biochemical Laboratory



Have you ever given a thought to the origin of these instructions and the reasons why a manufacturer should put such a warning on a label? Some, of course, are obvious—lighter fluid is inflammable, so you don't play around with it near an open flame; nor do you intentionally drop a bleaching agent on your clothes or skin; after all, you expect it to bleach them too. Reading some of the other instructions, however, would make you think the manufacturer didn't want you to use his product at all. On the contrary, in fact, he just wants to make sure you use it safely and for the purpose for which it was designed.

General view of the Industrial Hygiene Research Laboratories, Alderley Park, Cheshire



116 Wall chart controlling progress of long-term experiments

What determines whether we put a warning on the label, and who decides the nature of that warning? With some chemicals that are scheduled poisons and dangerous drugs there is a legal obligation to affix a warning in specified terms on the container; with others, a warning notice is suggested by a Government committee. In other cases the need for a warning and the way in which it is expressed is agreed by a committee of the trade association to which ICI belongs, i.e. the Association of British Chemical Manufacturers.

But on whose advice do we act, as a company, in the matter of labelling, and whose advice do we seek in that still wider sphere when a decision must be reached on whether or not a chemical is safe for a given use? For instance, it may be required as an additive to food, as a component of a food wrapper, as a constituent of a paint or a cosmetic.

What precautions must be taken to safeguard the user, and what must be done in its manufacture to protect our own colleagues from exposure to undue risk?

The provision of this advice is one of the functions of the medical service of the Company. It is a function which becomes more and more important as hazards are realised and as the public and Government Departments throughout the countries of the world become more aware of the problem. This aspect of the doctor's job in industry may surprise you, because your contact with the medical service may only have been when you visited the department for a medical examination when you joined the Company many years ago, or perhaps when you went along for treatment after you absent-mindedly grabbed hold of the business end of the soldering iron or slipped on the steps on the way into the plant. The

efficiency and the freshly laundered appearance of the nursing sister on that occasion, we hope, gave you confidence and made you feel that at work you were as well looked after and treated as you would be at home or in hospital.

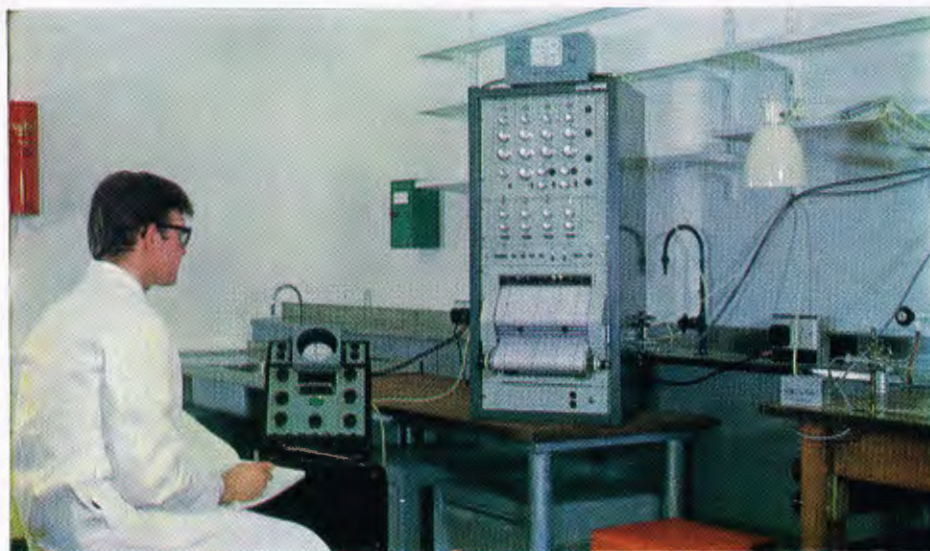
The treatment service has grown up over the years in all our factories. It has replaced the first aid box on the wall and has become a valuable adjunct to the National Health Service. It is a help to the family doctor to know that his patients can receive or continue treatment in what is virtually a hospital atmosphere, and it is, of course, convenient for the patient—for you—to be able to obtain advice and treatment while you are at work without losing too much time in doing so. It is a part of the medical service which will always be necessary and which will always be provided by thoughtful employers. If, however, you ask the doctors and nurses for their views they will tell you that their most important function is not in treating but in *preventing* disease, and that as far as occupational disease is concerned this can only be done in the industry itself.

Nurses and doctors are trained observers, and any peculiar or unusual symptom or sign which may conceivably be due to an occupational cause will be followed up very carefully to find out why and how it has occurred and to try to prevent any recurrence. A great deal of knowledge about the ill effects of chemicals long in use has come from observation of human illness. The Greeks and Romans used a naturally occurring lead carbonate as a constituent of paints for ships, and many of the symptoms of what we now know to be lead poisoning were described in their medical writings. Because of the widespread use of lead salts in the pottery industry, a complete description of the clinical picture in lead poisoning in man was written before the middle of the last century.

"Mad as a hatter," familiar enough as a phrase, doesn't commemorate the White Rabbit's friend who gave a tea-party but derives from the mental symptoms, outbursts of rage, even hallucinations and delusions, produced in workers in the felt hat industry by prolonged exposure to mercuric nitrate, into which the furs were dipped to help the process of felting. Much of the information which has led to a number of industrial diseases being made notifiable under the various



Atmosphere Exposure Laboratory



Physiology Laboratory

Factories Acts has been gained through observation of the effects of over-exposure in workers. Many skin irritants have been traced as a result of the observation and experience of the medical officers in the factories, and steps have been taken either to eradicate the undesirable materials or to make their manufacture and use safe if they are handled properly.

This brings us back to warning labels again. The doctors don't actually write the warnings—all they do is to advise the technical experts of the hazard which has been observed and how to overcome it or avoid it. The chemist who first works out the nature of a chemical can't always tell if it's harmful just by looking at its formula. His suspicions may be aroused, however, or he may have noted some peculiarity of action, and be able to suggest a safe limit for its use. A lot more information must be obtained from the toxicologists, and any new substance which is to be developed for a process or for sale is therefore submitted in our company by the Division Medical Officer to the Industrial Hygiene Research Laboratory. Knowledge gained from human experience may be the main guide to advice given on the hazards of old and well-established chemicals, but there is no need to use employees as "guinea-pigs" to obtain information on new ones. It's better and safer to use the guinea-pig (among other animals) itself. The nature of the experiments carried out depend on the chemical and physical properties of the substance, the manner in which

persons may be exposed to it and the method of its use. Thus, the most useful information on an extremely volatile substance is obtained by testing its acute effects by inhalation or by seeing the accumulated effect of a number of intermittent doses. The important information about an oil-soluble agent for a plastic film to be used for wrapping butter will come from long-term feeding experiments. A substance which is going to end up in the paint on a child's cot, or in the pigment of a crayon, will be chewed pretty thoroughly by laboratory animals. If it's likely to be worn next to the skin, it may literally have to be "tried out on the dog" first. If it is in any way to be added to food it will be eaten by rats and mice for the whole of their lifetime—about two years—before it is declared safe.

All this is routine work for the laboratory, but in addition to its job as a service station it also carries out investigations in its physiological and biochemical sections which eventually help the Division Medical Services to control the hazards of various chemicals during manufacture. New methods of analysis are worked out, safe levels of chemical substances in the working atmosphere are established, and biochemical tests are suggested for controlling the exposure of the operators to any hazardous chemicals.

Laboratories such as our Industrial Hygiene Research Laboratory have been in existence in the United States for some time, but it is only in recent years that other British companies have followed our

lead and have built their own units. In 1948, when ours was started in huts at The Frythe, it was a pioneering effort. Since then the demands of the Divisions have grown, and the biological evidence needed to satisfy the legislative demands of governments at home and overseas has become so complicated that it became obvious that more space would be required. Consequently new premises were built at Alderley Park, and were occupied at the end of last year. Spacious and modernly equipped laboratories and animal houses are provided for its three experimental sections—biochemistry, pathology and physiology. Adequate space also is given to the information section, which is recognised in the Company as a special centre on toxicological information and on world legislation relating to food additives.

The information obtained from the hygiene research laboratory and from the medical service in the factories is correlated and passed to the manufacturing Division, where suitable action can be taken. There the handling instructions and precautionary notices are composed and are issued to warn employees and customers of the possible dangers which may be encountered in making or using the material. Government Departments in various countries may have to be supplied with all the toxicological data before they allow the material to be used in food or cosmetics, or even as a pesticide. The home gardener must be warned about dangers if the material is swallowed or spilled on skin or clothing or if its fumes are breathed. Even the user of a grease spot remover must be warned not to breathe the vapour but to use it in the fresh air.

This is the background to the warning message on the label. It isn't just the result of inspired guesswork and it hasn't been concocted to make the use of the material difficult. The very severe and intensive testing of all products assures those engaged in the manufacturing processes and their customers that great care is taken to ensure their protection. The service of preventive medicine, the careful observation and supervision by the medical officers and nurses in the factory and the scientific evidence provided by the toxicological laboratories all help to achieve this target.

You *will* read the label and follow the instructions carefully—won't you?

The brave days of St. Rollox



A view of the works, showing Tennant's Stalk, engraved in 1833

by H. Hutchison

When St. Rollox Works began in 1797 green fields surrounded the working buildings. Glasgow, a prosperous city of some 70,000 inhabitants, stopped at the Townhead, and those who came to work in St. Rollox had some way to walk through country lanes. Some fifteen years earlier the great tobacco trade had been ruined by the American War of Independence, so the scarlet-cloaked Tobacco Lords with their gold-topped canes no longer paced the "plainstanes"—at that time the only substantial paving in the City. Within sight were the ancient cathedral and the university, then situated where the College Goods Station of British Railways now stands.

Although the tobacco trade had largely gone, Glasgow was forceful and not discouraged. "New manufacture which promises to be a source of much more permanent wealth than the other" had been effectively established. Cotton was king—fine cotton goods and linens that had a ready sale at high prices. Bleach-fields and print-fields lined the banks of the clear streams and the Clyde which teemed with salmon.

It was towards such a city—poised without knowing for steam and the industrial revolution—that the young Charles Tennant came from his home on Glenconner farm, Ayrshire, whence his father John factored the Ochiltree estates. Young Tennant, a trained weaver, was an ingenious, forceful and liberal man who knew the literature of his time.

His father, "gude auld Glen," was a personal friend of Robert Burns's father. Indeed, it is said that Burns read many of his poems aloud for the first time in Glenconner farm with John Tennant as critical audience. Certainly Burns thought highly of the son, "Wabster Charlie—I'm tauld he offers very fairly," who was the father of Britain's vast chemical industry.

Leaving his loom, Charles Tennant bought a bleachfield near Paisley in Renfrewshire and, frustrated by the slowness of the natural bleaching process that took many months of exposure to wind and sun and rain, discovered a brilliant answer. Aware that although chlorine would quickly bleach the fibres the gas could not readily be applied, he

found out how to combine the chlorine with slaked lime, so that bleaching power was retained by a solution that had no rotting effect on fabrics.

The tremendous significance of the discovery was quickly assessed by fabric makers throughout Britain, who ignored the patents while greatly profiting from the application of bleaching liquor or bleaching powder to their work. St. Rollox was built on its present site to make bleaching powder, which in 1799 was effectively covered by new patents, and, happily, a prosperous future was thereby secured.

Within a few years the product was calculated to have saved the linen bleachers of Northern Ireland about £167,000, and they were grateful. Indeed, the trustees for the Promotion of the Irish Linen and Hemp Manufacture of Northern Ireland voted £10,000 to go to the inventor, but Charles Tennant got none of it. One of Tennant's early partners was Mr. Charles Mackintosh, F.R.S., whose son George, in his father's biography, computed that in some forty years bleaching powder had saved the textile men of Britain £423,667,014 2s. 1d.

—presumably a definitive example of pre-computer accuracy!

So in 1797 St. Rollox—incidentally a corruption of St. Roche, a medieval Gascon nobleman and French Franciscan who was looked upon as the patron saint of those who suffered from plague—rose on the outskirts of Glasgow, but was not contained within the City. Today the factory's distinguished life is over, partly because the city with its million inhabitants, more or less, needs the land for its bold Townhead Development, and partly because its only remaining product can be made elsewhere on a large new plant capable of satisfying much of Scotland's demand. For many years sulphuric acid has been the sole product of St. Rollox, but this was not always so.

In the years between 1797 and 1964 the name St. Rollox has secured an honoured place in the industrial history of Britain—a chapter that demonstrates how factories, like empires, beset by circumstances, can rise and fall.

Those who see the end cannot imagine the beginning. When St. Rollox began to produce, scarcely a plume of smoke darkened Glasgow skies, yet when the Statistical Account for Scotland was published in 1845 the Glasgow section could record that "the chemical works at St. Rollox, now carried on under the firm of Charles Tennant and Company, the most extensive of their kind in Europe, covers ten acres of ground, and within its walls there are buildings that cover 27,340 square yards of ground. In the

premises there are upwards of 100 furnaces, retorts or fireplaces. In one apartment there are platinum vessels to the value of £7,000. In this great concern upwards of 600 tons of coal are consumed weekly." The product range included sulphuric, nitric and hydrochloric acids, soda ash, soda crystals, soap, saltcake and, of course, bleaching powder.

About this time St. Rollox, at the peak of its greatness, employing some 2000 men on a most concentrated site, was firmly managed by young John Tennant, who first of all lived in a house on the site, then, on the death of his father Charles, moved to the family mansion at 195 West George Street, which later became the first Nobel House. A practical chemist, John, of whom it was said "the nature of the man was too strenuous to let him be always bland and smooth," was also for the Reform. So it was with the Tennants of St. Rollox and so, fortunately, it was to continue.

In 1856, although the value of the works was conceded, their beauty was not extolled, for "these are necessarily black and dirty and some of them are as infernal in appearance as we can well imagine any earthly place to be. The buildings occupy an immense square from which shoot up numerous chimneys. Most of the chimneys are equal to the largest in other towns, but they are mere satellites to the monster of the place—the Chimney!"

"The Chimney" was, of course, Tennant's Stalk, built between 1841 and 1842

which rose from the ground to the dizzy height of 447 ft. 8 in. The depth of the foundations was 14 ft. 10 in., the diameter of the chimney at base 45 ft. and at the top 14 ft. 10 in. This remarkable chimney was built so that it could float off muriatic and other noxious fumes far above the now surrounding houses, and to do so the better it was built as a cone within a cone to prevent the cooling and condensing of hydrochloric gases. When, however, the chimney was ready, the process had been so improved by earlier condensation that very little hydrochloric acid gas went up the stalk, which was used mainly to convey away the products of combustion from about 120 tons of coal a day, some of the conveying flues being 400 yards long.

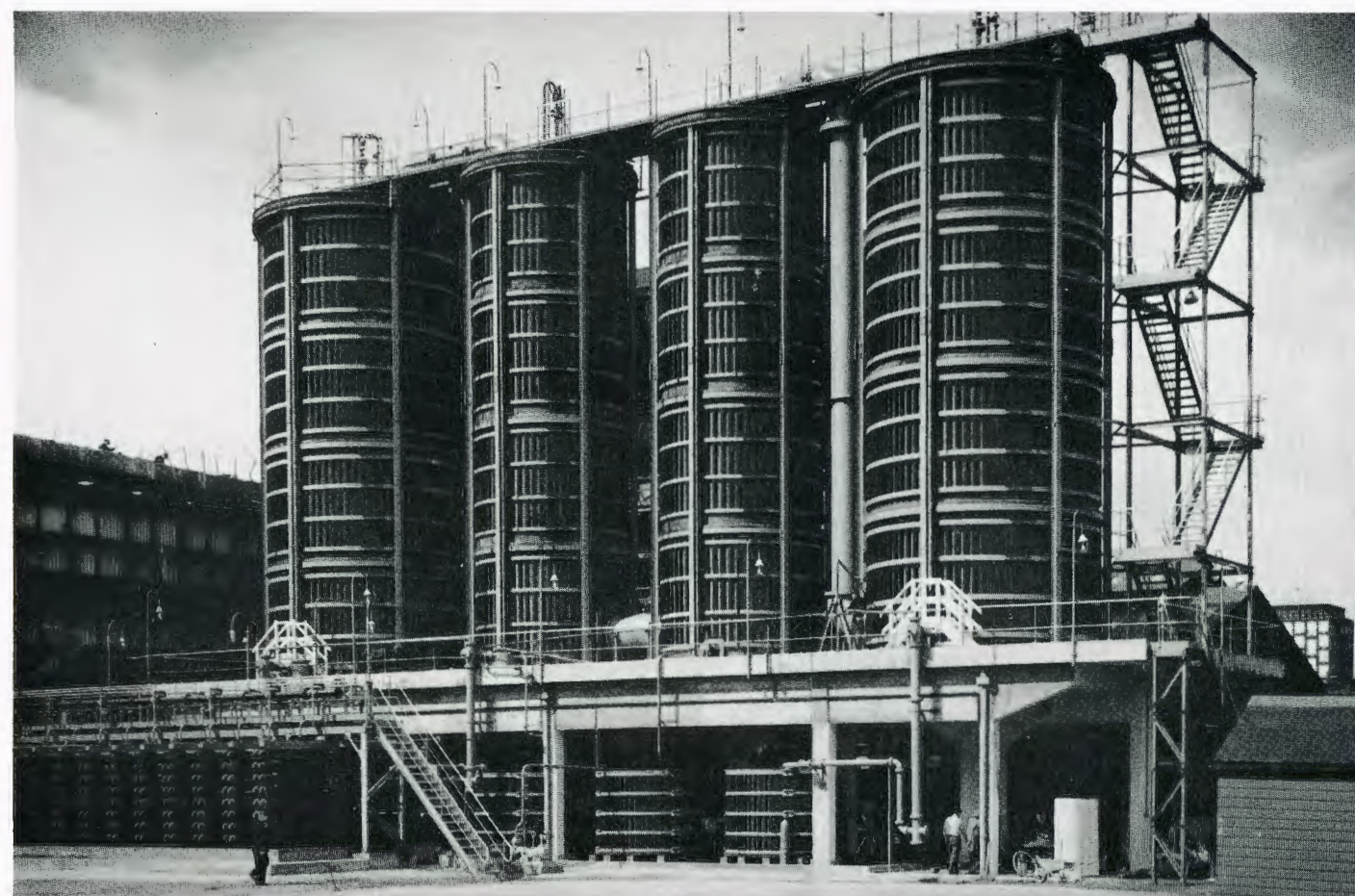
"The Chimney" was a triumph of the building art, with over one and a quarter million bricks in its construction. Before it went into use, the braver spirits among the officials were hoisted to the top, whence from a platform they toasted the view and future success in champagne.

Two mighty cracks developed in the outer casing two years afterwards. For a time it was thought that a controlled captive balloon might be used to survey the damage, for ordinary scaffolding would have been too dangerous and too costly, but ultimately an ingenious climbing machine was developed that also permitted effective repair, so that the Stalk remained until demolition in the early 1920s.

Perhaps like some humans and other tall chimneys, "it showed, in the course of years, a slight deviation from the perpendicular, but this had no effect upon its stability." It is appropriate, too, that St. Rollox, during its first 50 years, should have shared in another dramatic event that owed much to the force of Charles Tennant and his friendship with George Stephenson. On the perimeter, a small stone building stood for many years—the first railway passenger booking office in Scotland. St. Rollox was one of the terminals of the Glasgow and Garnkirk Railway, officially inaugurated on 2nd July 1831, with Charles Tennant an enthusiastic sponsor and a passenger.

The locomotive for this occasion was designed by George Stephenson, and on its first passenger run was driven by the great man himself. Aptly its name was *St. Rollox*.

When the first 50 years of St. Rollox



A recent view showing the Petersen towers

were nearly over there were signs of profound change. The heavy industrial revolution gathered pace, but there was recession in the Scottish cotton industry as Lancashire increased its strength. Besides a local decline in the demand for bleaching powder, there was formidably increasing competition from newly established manufacturers of alkali more happily situated over the Cheshire saltbeds and within easy reach of coal and limestone.

This competition had a marked effect on employment at St. Rollox, especially after the establishment of Brunner, Mond & Co. at Winnington and the factories at Widnes that became the United Alkali Co. By 1875 the number employed had fallen to 1200, and by 1894 that number had been further reduced to 520.

The third generation in the business, Sir Charles, took a vast and formative interest in Scottish industrial and political affairs, as well as in art. Besides being chairman of Charles Tennant & Co., he was chairman of the Tharsis Sulphur and Copper Co., the Union Bank of Scotland, Nobel's Explosives Co., the Steel Company of Scotland and the Mysore Gold

Mining Co. In 1911 his eldest surviving son became the first Lord Glenconner, and none can forget that his third daughter Margot became the first Countess of Oxford and Asquith.

In this century St. Rollox has mainly been a producer of sulphuric acid, for much of the time by the old lead chamber process whose chemistry perplexed so many earnest young men for so long. It is for these great, dark grey, rectangular vaults that most people will remember St. Rollox. Indeed, when the present Petersen Towers were installed in 1955 and the old lead chambers taken down, some 1000 tons of sheet lead were salvaged.

But the lead chamber, however utilitarian it became, had its moments of glory. About 1890, when electricity had just arrived in Glasgow, a new lead chamber had been completed at St. Rollox. It was given a splendid official opening. Electric light was led in and the chamber was temporarily floored. Margot Tennant led the ball.

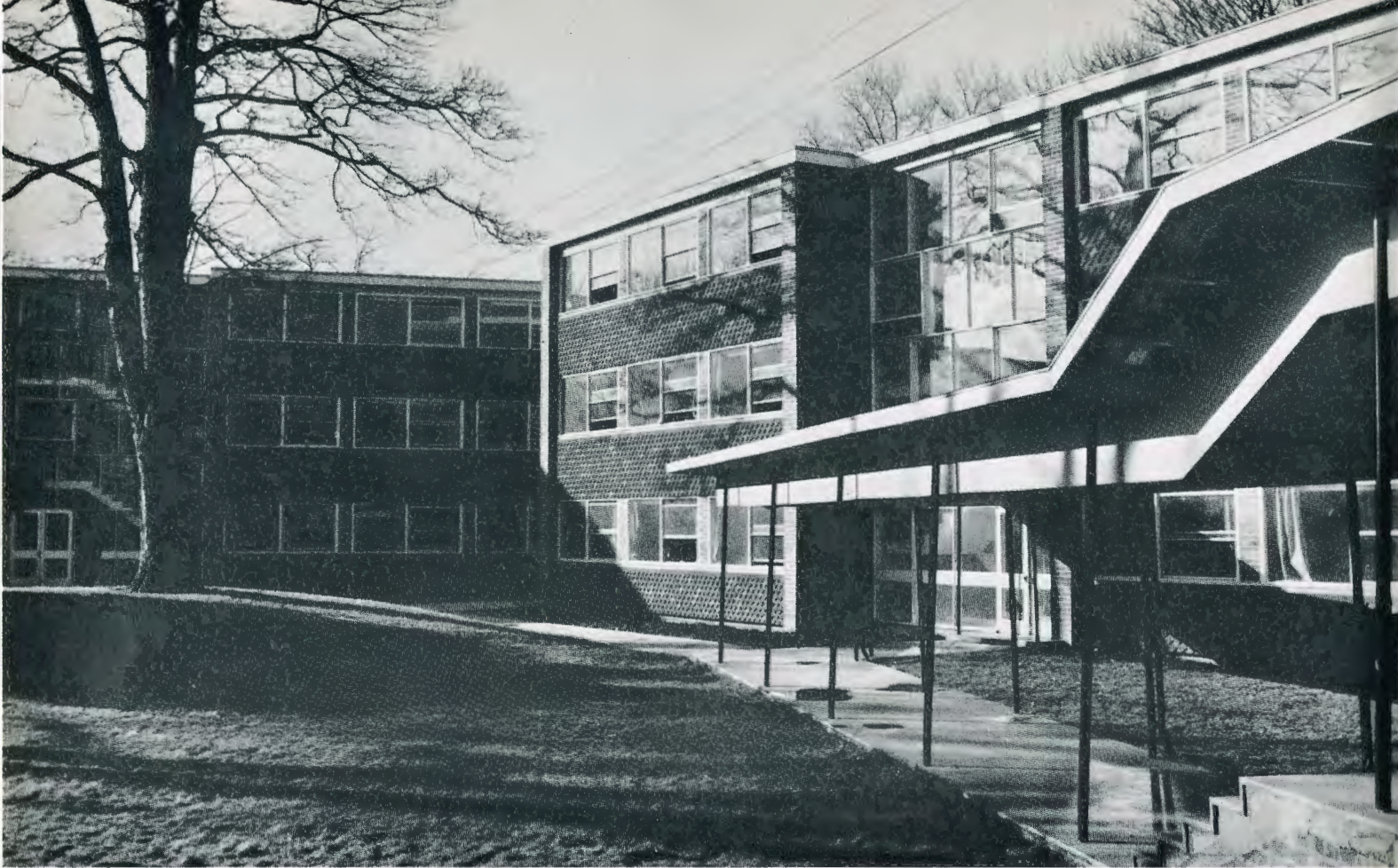
When the ICI merger took place, St. Rollox was part of the United Alkali Co., employing just over 100 workers. Rich

in history, but with its best days over, it still had important work to do during the Second World War and after, when sulphuric acid was scarce, and employment rose to a peak number of 260. From 1947, however, the numbers again fell until, when the impending closure was announced last December, 43 men and women constituted the staff and payroll.

None walking through the works could fail to gather the sense of history. There were, for example, some cannon balls to be seen at one time. These were the residue from remarkable experiments which works manager and chief chemist Mr. William Mactear conducted in the 1870s, as a result of which he claimed to have made "crystallised forms of carbon that were perfectly pure and transparent and had all the refractive power of diamonds." Unfortunately when Professor Story-Maskelyne of the British Museum examined the particles they would not burn, and he concluded "that the substance supposed to be artificially formed diamond is not diamond and is not carbon." Had these optimistic claims been justified, St. Rollox might have diversified its range most interestingly.



120 The opening of the Glasgow and Garnkirk Railway, 1831



Technology and Higher Education *by Trevor Owen*

In the February/March issue of the *Magazine*, Mr. A. D. C. Peterson, the Director of the Department of Education at Oxford University, wrote about "New Universities and the Needs of Society." In his article he made one remark which brought answering cries from the heart of at least one Division personnel manager.

"An enquiry recently carried out by the Oxford University Department of Education," he wrote, "indicated that . . . the 'image' of pure science is very much more attractive to sixth-formers, and even to sixth-form masters, than that of applied science. From the replies given by sixth-formers to a questionnaire, it is clear that this impression is largely based on sheer ignorance. Not only did we meet the prevalent and vague opinion that pure science was more 'interesting' but the much odder view that pure science was

benefit of humanity while applied science was a mercenary activity attracting only those who wanted to get on in the affluent society."

The attractiveness of pure science does not end with the sixth forms, nor does the ignorance of applied science. Most of the chemistry graduates we get applying to us say that they are primarily interested (or even only interested) in pure research. It is very rare for anyone to express a preference for production or for technical service or development work, and there is a clear feeling that such a preference would not be quite decent—pure research is the only thing that is "respectable."

This is a pity, because many of the people who have been brought up to believe that "pure research" is the only thing worth doing not only enjoy themselves immensely as applied scientists once they try it, but would never make

satisfactory or satisfied pure researchers however hard they tried.

What is sometimes ignored is that the future of this country is largely dependent on the future of its industry, and the future of industry is in its turn largely dependent on the numbers and quality of its applied scientists. The process of invention is, in fact, partly concerned with pure science but partly (and perhaps to a greater extent) with applied science or technology. What is needed is often not the man who can pursue knowledge to an ultimate ideal solution (time and money often make the ideal solution impractical anyway) but the man who can apply knowledge in such a way as to provide the most effective solution to a problem in the circumstances prevailing at the time. This man is the applied scientist or the technologist.

There used to be a supply of such

people in the past from the great experimenters who started in laboratories as boys and then made their way forward on the basis of their practical experience (sometimes supplemented by further formal education later in life), but such people nowadays tend to go direct to universities and end up as pure scientists. There is a danger that in this way our balance of technical effort will be upset—it was pointed out in the Robbins report that the country's supply of trained technologists is already proportionately less than that of any other major industrial country—and it is in the correction of this balance that the colleges of advanced technology have made a great and increasing contribution in the eight years since they were first established.

The "CATs" attain university status this autumn, and it is a good moment to consider what they have achieved and whether they have succeeded in providing a higher education in applied science and technology (Robbins does not distinguish between the two terms and I don't intend to try to) which is equal to the traditional courses in pure science.

From the date of their establishment until now the primary award of the CATs has been the Diploma in Technology, which will soon become an honours degree. The National Council for Technological Awards, set up by the Minister of Education in 1955, established the basis on which this diploma should be awarded. It was to be equivalent in standard to an honours degree; it could be either full time or on a "sandwich" basis (with periods in college alternating with periods in industry), but either way there was to be at least one year's suitable industrial training integrated with the academic training; liberal studies had to be included; the colleges were to provide "a substantial programme of advanced studies" and "good library facilities and good social amenities" and were to be residential if possible. It was regarded as "essential that staff engaged on the course should have opportunities for research."

ICI's use of the CATs has grown quite rapidly and by November last there were 113 employees of the Company at CATs studying for Diplomas in Technology. They came from almost every Division and were in many different colleges up and down the country.

Our own experience in the Paints Division has so far been entirely with the

Birmingham College of Advanced Technology. We wanted to send people somewhere where they would have to live away from home (so that they should learn independence as well as chemistry) but somewhere which was not too inaccessible from Slough (so that we could maintain reasonable contact with the college). Birmingham seemed about right. We saw it, talked to the people there, liked it and them, and have now sent 39 young men and women from our laboratory staff there, to do Dip. Techs. in Applied Chemistry, since 1957. Our experience at Birmingham leaves us in little doubt that the high aims which were set in the beginning by the National Council for Technological Awards are in fact being achieved.

Let's take the statistics first. Of the 39 people we sent, seven failed to complete the course. This figure is higher than it ought to be, but there will always be failures, particularly if a high standard is maintained in the course, and in any case mistakes of selection are more likely to be made when a course is in infancy. I think there will be fewer failures hence forward. Sixteen of the 39 have still to complete the course, and that leaves a further sixteen who acquired the Diploma. Three have since left the Company, and that leaves three who are working with the Division as Experimental Officers and ten as Technical Officers—a small but useful addition to the Division's technical strength.

But what seems to me to be of more

importance in these comparatively early days is not the bare statistics but the quality of the training that has been given. Have the colleges been able to match the standards of the universities? Have they provided, in Joyce Carey's memorable phrase, "education as well as information"? Are they, in short, worthy of becoming universities? Or only second-class universities?

The Birmingham CAT has, I have no doubt, provided a university education in the fullest sense. It has the physical properties of a university to start with. Most of our own sandwich course students have been fortunate to "live in" in Gracie Hall, where the Warden (who is also a member of the teaching staff of the college) administers encouragement, enthusiasm and chastening in almost equal doses. At Gracie Hall there is a library, common room, music room and (of course) a hall, and each student has his own excellent bed-sitting room. As a product of one of the older universities, myself, I regard Gracie Hall with envy. Although Birmingham is short of such accommodation, at least what they have is good.

And then there is, as there should be at any university, a lot more going on than mere book learning. There is a superbly equipped and well-used theatre attached to the college. The Students Guild, with an annual budget of £7000, organises anything from rock climbing expeditions to symphony concerts, from twist sessions to chess, and has its own newspaper

continued on page 133



The library and (opposite page) the modern exterior of Gracie Hall

British Nylon Spinners Ltd.

by G. F. Whitby

It was announced on 27th April that ICI and Courtaulds had reached an agreement whereby BNS would become a wholly owned subsidiary of ICI. In principle, the agreement involved on the one hand the cancellation of Courtaulds' shareholding in BNS, and on the other the cancellation of ICI's stockholding in Courtaulds and the payment to Courtaulds of £10 million over a period of five years.

An arrangement of this kind, involving reduction of the issued capital of Courtaulds and of BNS, must be approved by

the stockholders of the two companies at General Meetings. These meetings took place on 8th July, and on 16th July the ICI stockholders gave their approval for the fulfilment of all the conditions of the arrangement. Finally, it was necessary to obtain approval from the Chancery Division of the High Court of Justice, which was given on 27th July and became effective on 31st July.

Now that all these actions have been taken, BNS is a 100% subsidiary of ICI, and ICI is no longer a stockholder of Courtaulds. Courtaulds have already announced that they are building plants to manufacture nylon 6 fibre which will be sold under the trade name 'Celon,' and they plan to have 50m. lb. per annum production capacity within two years. Thus Courtaulds and ICI will be competitors in nylon and in other fibre manufacture.

The rapid expansion of demand for polyamide fibres will continue for a good many years, not only in the UK but throughout the world. Textile industries are notably affected by changes in the general economic climate, and the demand for a fibre of any type has rarely followed a smooth course over a period of years. There will undoubtedly be periods when trade will be difficult; but the demand for the synthetic fibres has grown, and continues to grow, so fast that sales have increased even during years when textile industries overall have been depressed. Under these circumstances it is natural that other manufacturers everywhere are extending their plants, and so far as the UK market is concerned, AKU (Dutch) already have a nylon 6 plant in Northern

Ireland which they are extending, and Chemstrand are building a nylon 66 plant in Scotland. Both of these companies are experienced and competent fibremakers. In making their forward sales estimates BNS have already made adequate provision for the growth of competitive nylon sales from UK manufacturers and from imports. Thus there appears a sufficient opportunity for Courtaulds to build up their sales of nylon 6 without materially altering the major expansions already planned by BNS.

ICI recently announced the building of a large new plant to expand nylon polymer manufacture by over 50%, mainly for fibre manufacture, and sees no reason to change this. 'Terylene' manufacture is also expanding rapidly throughout Europe, in the USA, in Japan, and to a smaller extent in many other countries. The present time, therefore, affords an excellent opportunity for ICI to develop the full potential of the technical and commercial resources which they and BNS have built up separately, to trade still more extensively in 'Bri-Nylon,' 'Terylene,' 'Ulstron,' its polypropylene fibre, and perhaps other fibres, and for Courtaulds to embark upon nylon manufacture themselves which can be exploited as part of their own range of man-made fibres.

One may ask why we are so confident about the future. 'Bri-Nylon,' 'Terylene' and 'Ulstron' are all excellent materials covering a wide range of textile uses. By the development of our technical and fibremaking processes we can foresee appreciable further reductions in costs over the years, and the skills and technical



British Nylon Spinners' headquarters and principal factory at Pontypool, Monmouthshire



Mr. F. C. Bagnall, Managing Director of British Nylon Spinners, and just appointed a non-executive Director of ICI. He is this year's President of the Textile Institute and Chairman of the British Man-made Fibres Federation. He is also President of the University College of South Wales and Monmouthshire

resources developed by BNS and Fibres Division will ensure that the quality of the fibre products are raised continuously and that new varieties are introduced for special applications. Thus the products can be expected to move into new markets and to increase their share of existing markets. In the world as a whole the demand for textiles is rising, and in the areas with the more advanced standards of living, e.g. Europe, North America and Australia, the demand for the more sophisticated products is increasing strongly. The combination of the resources of the Dyestuffs and Fibres Divisions and of BNS will immensely strengthen our position in this important area of world trade, and we shall have the power and the mobility to develop and use each fibre to the best advantage.

The Chairman of Courtaulds, in his Annual Report, expressed similar confidence in the future of their fibres, and this indicates the importance attached by

both companies to implementing the agreement now when the markets for the newer fibres are expanding.

The majority of people in ICI are well aware that we make substantial sales of chemicals to the textile trade and to other fibremakers in addition to our sales of fibres, dyes and textile auxiliaries. The sales of the ICI group, which now includes BNS, to textile companies and other fibremakers in the UK total over £100 million a year. With exports and overseas manufacture by subsidiary companies the sales of these products by the group throughout the world are more than £170 million. It will be seen, therefore, that our interest in the progressiveness and prosperity of the textile trade of the UK is very great, as is that of Courtaulds. ICI and Courtaulds have jointly and separately given appreciable financial support to a number of UK textile companies to promote the formation of a few bigger and more versatile groups, to help

to strengthen the industry generally, and to increase its ability to meet changing, but always competitive, circumstances in world trade. The actions taken by ICI have been well received by the textile trade itself and favourably commented upon by the Press.

The Company is expanding its manufacturing activities overseas, and already there are joint nylon and 'Terylene' ventures in Australia, Canada and the United States. Others will follow, and indeed, as in the UK, added strength will always be gained by having two or three good fibres to manufacture and sell.

In ICI we have immense respect for the great tradition built up by BNS, and everyone, particularly the Fibres and Dyestuffs Divisions, welcomes this closer association. The expansion of our business will enable us to use the combined resources to the best advantage and give added opportunities for the employees of both companies.

AUGUST 1914

Events of half a century ago,
in the shadows of which mankind still lives

"Telegrams still flowed in from the chancelleries of Europe as the last futile appeals of reason were overtaken by the cannonade. In the War Room of the Admiralty, where I sat waiting, one could hear the clock tick. From Parliament Square came the murmurs of the crowd; but they sounded distant and the world seemed very still. The tumult of the struggle for life was over; it was succeeded by the silence of ruin and death. We were to awake in Pandemonium." (*The World Crisis, 1911-1914*, by Sir Winston Churchill)



Crowds gather outside the Foreign Office on Sunday, 2nd August 1914, as the Cabinet meets to discuss the growing crisis



Outside the War Office on 5th August after the declaration of war on Germany



Recruiting begins and in London Territorials assemble at Somerset House



The scene which was to become so familiar - troops at Victoria Station before leaving for the front

PEOPLE & EVENTS

First Staff Conference

More than 100 staff committee and management representatives from Head Office, the Divisions and the Regions were welcomed by the Chairman, **Mr. S.P. Chambers** to the first Central Staff Conference at the Piccadilly Hotel, London, on 7th July, where they discussed subjects which ranged from the Company's long-term policy on work and leisure to pensions and the mechanisation of clerical work.

In his opening address the Chairman recalled that during the past 18 months rapid progress had been made in the formation of staff com-

mittees in the Company, so that today virtually all members of staff were represented by some form of staff committee, and all Divisions had held Division staff conferences. The Board had therefore decided to hold an informal and experimental Central Staff Conference. In the light of the experience which this gave them they would be able to decide whether further conferences of this type would be useful.

Commenting briefly on the Company's current progress, the Chairman said there had probably never been a period in its history when so much was happening and so much

progress was being made in so many places at the same time. This year our sales were running at record levels for many products and total sales were also at record levels. New developments, largely coming from the Company's own laboratories, were leading to the erection of new plants, and already the Board had sanctioned over £65 million of capital expenditure this year as against £76 million in the whole of last year and £23 million in 1962. Exports were also above last year's record figures.

Mr. Chambers also mentioned the way in which technological

changes are involving "quite revolutionary changes" in the pattern of employment, both in the operation of plants and in office work, where with the introduction of computers and other devices fewer people would be needed. In some cases this could involve personal upset and the disappearance for ever of certain types of work and certain skills which had served the Company well for many years. These facts must, however, be faced and it would be wrong to perpetuate older and more expensive methods; the prime duty must be to run the Company efficiently.



The first Central Staff Conference in session at the Piccadilly Hotel, London, on 7th July



Mr. S. P. Chambers, ICI Chairman, signs the visitors' book at Parliament Buildings, Wellington, New Zealand. With him are the Prime Minister of New Zealand, the Rt. Hon. H. J. Holyoake (left), and Mr. A. G. Robb, managing director of ICI(NZ) Ltd. The Chairman was on a three-week tour, taking in also Australia, Canada, Hong Kong, India, and the USA. While in New Zealand he visited the new nylon spinning plant at Auckland of Fibremakers Ltd. (jointly owned by ICIANZ and BNS), which is due in production later this year and which will use ICI nylon polymer imported from Britain

Tees-side refinery

ICI and the Phillips Petroleum Company of Oklahoma are to form a joint company to erect and operate an oil refinery at Tees-side with a capacity of 5 million tons a year of crude oil.

Phillips are to supply the crude oil and act as sales agents for products of the refinery other than naphtha, which ICI will use in its petrochemical operations. It is expected that the refinery will start operation early in 1966, and negotiations are proceeding with the Tees Conservancy Commission for the widening and deepening of the River Tees to permit delivery of crude oil supplies in large tankers.

Dr. K. W. Gee, formerly production manager and product area manager for phenols and deriva-

tives, has been appointed a director of the Heavy Organic Chemicals Division and will be the general manager of the new joint company.

Kennedy Memorial Fund

ICI is contributing £10,000 to the Lord Mayor of London's Kennedy Memorial Appeal. The Appeal, which is for £1 million, was launched on 7th May, and at 1st July contributions had reached about £200,000.

Lord Chandos, a non-executive director of ICI, was one of the committee appointed by the Prime Minister to consider what form the memorial to the late President Kennedy should take. As a result of the committee's recommendations the memorial is to take two forms. A small part of the money

donated will be used to erect a permanent memorial on a site at Runnymede; the bulk will be devoted to a scholarship scheme to send British students to Harvard University (President Kennedy's university), Redcliffe College or the Massachusetts Institute of Technology.

'Savlon' for Aberdeen

In this antibiotic age the seriousness of a typhoid epidemic lies not so much in the threat to life as in the speed with which the disease can incapacitate a large section of a community.

Consequently, when Aberdeen was recently faced with this situation, the Public Health Authority at once drew the public's attention to the vital importance of personal

hygiene in limiting the spread of the disease, and it is gratifying to know that the Health Authority recommended the use of ICI's 'Savlon' Liquid Antiseptic.

To meet the demand which ensued from this recommendation, special measures were taken to ensure that local supplies of 'Savlon' Liquid Antiseptic were readily available. These included the setting up of a local stock-point and the transfer to it of initial stock from Grangemouth warehouse by the local representatives before they were "confined" within the city boundaries. For the next fortnight their time was fully spent in maintaining stock levels and carrying out daily distribution throughout the city, thereby earning appreciation for what was considered a typical example of ICI service.

New ICI projects

Since we last went to press a number of new ICI development projects have been announced. The largest, in terms of cost, is another new plant to make nylon 66 polymer, which will cost £23 million and will raise ICI's output of this textile raw material by well over 50%.

The plant will be constructed alongside the existing nylon polymer plants at Wilton Works, and it is scheduled to be in production by 1966. The project includes the manufacture of intermediate products as well as the final polymer. Most of the money will, in fact, be spent on units for making the intermediate products. A large new unit for the production of nitric acid is included.

The bulk of the output, as before, will be for nylon fibre production, although a proportion is destined for conversion into nylon moulding powders for the plastics industry.

The new plant, when completed and handed over to ICI, will provide permanent jobs for about 800 people.

£20 million fertilizer programme

A £20 million investment programme for another major extension of the Agricultural Division's fertilizer production has also been announced. This programme includes a new 300,000 tons a year prilled ammonium nitrate plant at Severnside which will make a new high concentrated nitrogenous fertilizer. Construction is at an advanced stage and production will begin early in 1965.

A new urea plant—the world's largest—is to be built at Billingham



A new rigid vinyl sheet called 'Sintilon', suitable for all kinds of building applications, has been introduced by ICI (Hyde). It is available in several shades, colours and profiles, including corrugated sheet for roofing. It is lightweight, will not rust or rot, has good light transmission properties, and is self-extinguishing when exposed to flame



At the presentation of the Poole Bay Olympic Sailing Association prizes on 4th July Mr. Richard Arnold-Baker (Fibres Division), the first man ever to sail a boat fitted with sails of 'Terylene', presented a cheque for £447 16s. to the RYA Olympic and Special Purpose Fund on behalf of ICI. The cheque follows a promise by ICI to contribute a sum equal to that collected at the International Boat Show, when the public were invited to sink an Olympic Finn dinghy with pennies. Left to right: Sir Gordon Smith (Vice-Commodore, PBOSA), Mr. P. V. McKinnon (Chairman, RYA) and Mr. Arnold-Baker



A prototype two-storey bathroom, cloakroom and kitchen unit made basically from four very large pieces of 'Perspex' was shown by the new ICI Building Development Group at IBSAC (the Industrialised Building Systems and Components Exhibition) held at the Crystal Palace in June. The top floor contains a complete bathroom with walls, floor, ceiling, bath, bath alcove, basin and cupboards made from just two 'Perspex' shapings. The other two 'Perspex' shapings form a cloakroom and one wall of a kitchen on the ground floor



All aboard the Open-Day special at Severnside. This diesel loco was one of two which, coupled with guard's vans, gave visitors rides between the transport area and the packing sheds. Altogether more than 800 employees, their families and friends attended the Open Day—the first ever held at Severnside Works. (Photo: Bristol Evening Post)



The five Northern winners of the 'Terylene' fashion competition at Ringway Airport, Manchester, for a luncheon in their honour on 7th July. Each won a long weekend for two in Europe flying by the new BEA Trident, £50 in spending money, and a £50 holiday wardrobe of 'Terylene' clothes. More than 8000 entries were received for the competition

to come into operation in 1966. The new production will be primarily for Commonwealth and other overseas markets and should enable the Agricultural Division to treble its export trade in nitrogenous fertilizers over the next few years. Further expansion of ammonia capacity is also needed, and another new plant, with a capacity of at least 300,000 tons a year, is to be built. The site is to be announced shortly.

Since 1960 the Company has announced plans for new ammonia and fertilizer plants in the U.K. which, including this latest programme, will cost over £50 million.

Largest in Europe

Further developments in the North East have also been announced by HOC Division, who are to build a cyclohexane and aromatics plant on the Company's North Tees site alongside the crude oil distillation plant. It will be the largest petroleum-based aromatics complex in Europe and one of the largest in the world.

Rozenburg development

Abroad, the Company plans to construct three new plants at Rozenburg Works, near Rotterdam, at a total cost of over £10 million. The plants will make nylon 66 polymer, polythene and 'Melinex' polyester film, all products for which demand in Europe is expanding rapidly, but for which the tariffs against them are high.

The nylon polymer plant, with a

scheduled capacity of over 20,000 tons a year, will supply the bulk of its output to the new British Nylon Spinners plant at Oestringen in West Germany. The polythene plant will have a capacity of 50,000 tons a year and the 'Melinex' film plant initially 3000 tons.

The new plants represent the second phase in the development of the Rozenburg site, which was leased in 1961 for development as an ICI manufacturing site within the EEC. Two plants, for 'Perspex' and 'Diakon,' are already in operation.

Out of the pay queue

Standing in the pay queue is a thing of the past for almost one in five of the Company's 55,000 weekly paid payroll employees. Now more than 10,000 of them have their wages paid through a bank.

For many years this method of payment has been a condition of employment for the monthly paid staff, but its extension to the weekly payroll on a voluntary basis was introduced only five years ago.

This was at Wilton Works and resulted from a suggestion by shift workers, who had complained that because of their shift rotas they often had to make special journeys to the factory on their rest days to collect wages. The suggestion went to Central Council and then to the Main Board. A trial scheme was introduced at Wilton and later Works Councils throughout the Company were asked to consider the idea, and today the great

majority of works have some employees who are paid through banks. Not surprisingly, the greatest support for the scheme has come from the North East, where the idea originated. At Wilton 4500 of the payroll, exactly one-half of the total strength, are in the scheme and at Billingham one-third have chosen the new method.

Japanese translation

The latest of several foreign editions of the *History of Technology*, a Japanese translation of the original work, is nearing completion.

ICI and the Clarendon Press, Oxford, joined forces fifteen years ago to produce the original *History*. Sales of the resulting 4400-page, five-volume work (which costs forty guineas a set) have proved to be several times greater than the publishers expected at the outset.

Apart from the Japanese edition, an Italian edition is currently being published. In the United States the Library of Science book club published a special unabridged edition for its members.

The short *History of Technology* has just been published in a Dutch translation, and an Italian edition will appear shortly.

Magadi Jubilee Book

The Magadi Soda Company, a subsidiary of ICI making soda ash and salt in Kenya, was incorporated in 1911, and to commemorate its Golden Jubilee in 1961, the directors commissioned a well-

known Kenya writer, Mr. Mervyn F. Hill, to prepare a history of the Company. This book has now been published by The Kynoch Press for the Magadi Soda Company.

The story is of the vicissitudes and successes of the Magadi Soda Company during its first fifty years and shows the part it has played in the development of Kenya.

The price of the book to the public is 35s. plus 2s. 6d. packing and postage, but employees of ICI and its subsidiaries and associates may obtain copies at a reduced price of 17s. 6d. plus 2s. 6d. packing and postage. Members of ICI wishing to order copies at this price are asked to send £1 to The Kynoch Press, IMI (Kynoch) Ltd., P.O. Box 216, Witton, Birmingham 6, giving name and private address and quoting EPS or Works number for identification.

British Nylon Spinners

Following the High Court's sanction of the Courtaulds' Scheme of Arrangement, Mr. H. R. Mathys, Mr. W. P. Courtauld and Mr. H. L. Johnson are resigning from the Board of British Nylon Spinners Ltd.

Mr. F. C. Bagnall, managing director of BNS, has been appointed a director of ICI with effect on and from 1st August 1964. Mr. Bagnall will act as a non-executive director.

Sir Ronald Holroyd, one of ICI's deputy chairmen, will be appointed chairman of the Board of BNS and **Mr. G. F. Whitby** (ICI field director for fibres and textiles), **Dr. E. B. Abbot** (Fibres Division chairman) and **Dr. C. R. Mavin** (Dyestuffs Division chairman-designate) who will take the place of **Dr. J. Avery** who is retiring from ICI's service, will join the BNS Board.

Mr. W. Allman and **Mr. H. W. Morris**, assistant managing directors of BNS, will also be appointed directors of the Fibres Division of ICI and arrangements will be made for BNS to be represented on the Dyestuffs Division Board.

World Safety Congress

Mr. Clifford Hunter, head of ICI's Central Safety Department, was chairman of the Fourth World Congress on the prevention of occupational accidents and diseases which was held in London last month. Organised by RoSPA (the Royal Society for the Prevention of Accidents) in collaboration with the International Labour Office and the International Social Security Association, the Congress was attended

by more than 750 delegates from about 60 countries. It was the first time that Britain had been the host country, the three previous conferences having been held in Rome (1955), Brussels (1958) and Paris (1961). HRH the Duke of Edinburgh was president of the London Congress and visited the INTERSAF (International Exhibition of Personal Protective Equipment) Exhibition on the morning of 14th July and was present at the Government reception for delegates at Lancaster House in the evening.

For one day of the Congress delegates were the guests of British industry, and the factory visits arranged included a tour of Paints Division's Slough site. A reception for about 150 delegates and their wives was held at Imperial Chemical House the previous evening.

Export Council Post for Mr. P. C. Allen

On 20th July Mr. Edward Heath, Secretary of State for Industry, Trade and Regional Development and President of the Board of Trade, announced in the House of Commons the setting up of a British National Export Council and three export bodies for Canada, the US and Latin America, whose work would be linked to that of the Council. Mr. P. C. Allen, one of ICI's deputy chairmen and president of Canadian Industries Ltd., has been asked to form the Canadian Council. As chairman of this body he will also be a member of the British National Export Council.

Birthday Honours

Four ICI names were included in the recent Birthday Honours list. **Mr. A. R. Foster**, former chairman of ICI (India), received a knighthood; **Mr. J. V. S. Glass**, a Mond Division director, was awarded the OBE; **Mr. J. Gall Smith**, formerly group engineer of Nobel Division, and **Mr. J. C. Swanson**, a works engineer with Dyestuffs Division, both got the MBE.

Mr. Foster retired last March as chairman of ICI (India). Apart from a few months at Jealott's Hill when he first joined ICI in 1933, all his service was with ICI (India), of which he was appointed a director in 1948 and chairman in 1961. In 1963 he was elected president of the Bengal Chamber of Commerce and Industry and president of the Associated Chambers of Commerce for India—the first ICI man



The Duke of Edinburgh is greeted by Mr. and Mrs. Hunter who with the Rt. Hon. Joseph and Mrs. Godber welcomed the delegates of the Fourth World Safety Congress to the Government Reception at Lancaster House on 14th July



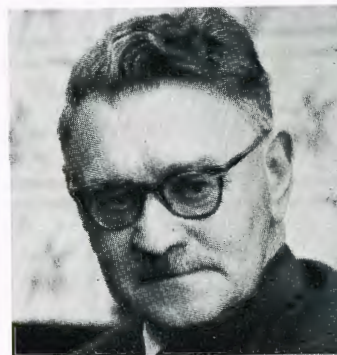
Miss Maria Bueno (Brazil) who regained the Ladies' Singles title at Wimbledon on 4th July with her defeat of Miss Margaret Smith (Australia), last year's champion. For her finals match Miss Bueno wore a 'Terylene' dress by Teddy Tinling



Mr. Foster



Mr. Glass



Mr. Gall Smith



Mr. Swanson

ever to hold these important posts, the holder of which is the acknowledged leader of the British business community in India—and he has received his knighthood in recognition of his services. He has also served on the Indian Council of Agricultural Research and was a governor of the Indian Institute of Technology in Delhi. His interests include horticulture—with a special interest in trees—and horses, and he is a former vice-president of the Royal Agri-horticultural Society, a former president of the Calcutta Polo Club, and was for some years a steward of the Royal Calcutta Turf Club.

Mr. Glass has been Product Group C director of the Mond Division since its formation in January. Educated at Oxford and Toronto Universities, he joined the then Billingham Division in 1930, transferring to the Research Department of General Chemicals Division two years later. In 1946 he became Division techno-commercial manager, in 1955 technical manager, and he was appointed to the Division board in 1960, at first as research director and from March 1960 to the end of last year as technical director.

Mr. Gall Smith retired last September from the Nobel Division after 30 years' service. He is a past chairman of the Glasgow and West Scotland Association of the Institution of Civil Engineers and a leading figure in the Boy Scout

movement, in local Church activities and in a number of charitable causes.

Mr. Swanson has been employed at the Dyestuffs Division's Grangemouth Works since 1937 and has been works engineer there since 1949. He is well known locally for his work in the Sea Cadet movement and is at present chairman of the Grangemouth unit.

Another award of interest to ICI readers is that of the BEM to Mr. F. Cull, a foreman with IMI (Kynoch), a subsidiary of ICI.

50 YEARS' SERVICE

The following employees have completed 50 years' service:

Mond Division: Mr. H. Bosley (19th June), Mr. E. Bramwell (15th June), Mr. C. L. Garner (15th March), Mr. H. Potter (15th June), Mr. J. Ramsey (1st June), **Plastics Division:** Mr. R. H. Langdon (10th June).

RETIREMENTS

Some recent announcements of retirements are:

Head Office: Mr. R. M. Currie, head of Central Work Study Department (retired 31st July); Dr. J. Taylor, ICI director (retiring 31st August).

Heavy Organic Chemicals Division: Mr. J. D. Brown, engineering director (retired 31st May). **Mond Division:** Mr. E. P. C. Beck, estate manager (retired 30th June); Mr. J. H. Harris, Power

Department manager (retired 31st July).

Paints Division: Mr. R. D. S. Shrimpton, finance and administration director (retired 30th June); Mr. L. D. Stewart, joint managing director (retired 30th June).

Dr. J. Taylor

Mr. S. P. Chambers writes:

Dr. James Taylor is retiring from the Board of ICI and from the Company's service at the end of August, thus terminating a very distinguished career with the Company, which he has served for 36 years. A graduate of Durham, Paris and Utrecht Universities, in the last of which he took a Doctorate in science and mathematics, Dr. Taylor worked in 1927 in the Cavendish Laboratory under two very eminent scientists, Sir J. J. Thomson and Lord Rutherford, and then joined the Research Department of Nobel Division as a physicist.

Successive promotions brought him to the Board of Nobel Division in 1946, and he became a joint managing director of that Division in 1951 and was appointed a Director of the Main Board in 1952.

He has for many years now been the Director responsible for our metals interests and has been the prime mover in a number of changes which have led progressively to the better organisation and greater profitability of these interests. The formation of Yorkshire Imperial Metals, which married our copper tube interests with those of Yorkshire Copper Works, was inspired by Dr. Taylor, and with this move copper tube manufacture became substantially more profitable, notwithstanding the highly competitive conditions in the markets for these products. The setting up of Imperial Metal Industries Ltd., Imperial Metal Industries (Kynoch) Ltd. and Imperialco (in which we joined forces with the Aluminum Company of America on the fabrication of

aluminium products in this country) are due very largely to his inspiration and the drive which he put into these projects. The need to reorganise in such a way that there is closer integration of the functions of production, marketing and selling on a product group basis was recognised by Dr. Taylor and implemented in what was the Metals Division before we got round to doing much the same thing in other parts of our Company.

Dr. Taylor has been a tireless worker and expected members of his staff to follow his example. With a keen scientific mind, he never had time for anything put forward on uncertain grounds or loosely argued with an inadequate basis of fact. Nevertheless he has the liveliest sense of humour, and we shall all miss his sudden and brilliant witticisms at the Board table.

His colleagues throughout the Company, and particularly on the Main Board, recognise that with his retirement they are losing somebody who has made a great contribution to the progress of the Company and one who has always been as much liked for his personal qualities as for his capacity as an industrial leader.

Mr. R. M. Currie

Mr. G. F. Whitby writes:

Sir Ewart Smith, who became a director immediately after the war, had many ideas for improving the design of plants and the management of factories; he laid emphasis on method study, on productivity, and on incentives as a means of rewarding effort. No one in ICI had the necessary experience to develop the newest techniques of Work Study, but a search outside was successful and into ICI strode Russell Currie in 1947.

Mr. Currie had been engineering-chief until 1942 of the Shanghai Waterworks Co., then the largest water undertaking in the world, and he had a fine record of achievement

during sixteen years' service. In 1940-41 he was a technical adviser to the Far Eastern Economic Conference, and from 1942 to 1947 he was with Associated Industrial Consultants, where he acquired a reputation for solving difficult factory organisation and management problems.

To join a complex industrial company like ICI in a senior position presents many problems, but Russell, with his great understanding of human relations in industry, took over his responsibilities so smoothly and quickly that he was rarely thought of as an outsider. Within a few years the success of Work Study methods in ICI led to increasing requests from the Government, the trade unions, the armed forces, public undertakings and others for a series of lectures for senior people; with the Company's agreement, Russell

Currie began such lectures in 1953, and they still occasionally take place.

Russell Currie played a major part in the formation of the Work Study Society, becoming its first president, and when it became the Institute of Work Study in 1961 he was again installed as the first president. Also in 1961 he became the first president of the European Work Study Federation, an office he now holds for a second term. For his work in British industry and for the services and nationalised industries he was awarded the CBE in 1957.

The activities of Russell Currie and the Work Study Department are widely known in the ICI Group, and he will be missed greatly by very many people of all ranks. Now he plans to undertake consultancy work, and we give good wishes to him in the years ahead.

OBITUARY

Mr. G. K. Hampshire

We record with deep regret the death on 4th June of Mr. G. K. Hampshire, a former director of ICI.

Sir Ronald Holroyd writes:

During his 39 years with the Company George Hampshire became one of its best-known and best-liked personalities. A warm-hearted, understanding man's man, he entered easily and enthusiastically into anything involving contacts with people in the Divisions, at Central Works Council, and in activities outside ICI.

Although his outstanding personal qualities were clearly evident during his last three years as a valued member of the Main ICI Board, they were probably most widely demonstrated during his 12 years' chairmanship of General Chemicals Division. His enthusiasm, excel-

lent commercial judgment, courage in facing up to major decisions and determination in adhering to them, coupled with his friendly and at the same time firm personal approach won for him the confidence and loyalty of colleagues and staff throughout the Division. The same qualities facilitated co-operation with other parts of the Company and ensured good and friendly relations with other chemical companies. As leader of the Division Mr. Hampshire had the satisfaction of seeing its sales treble and its profits quadruple.

George Hampshire's courage was not limited to business matters. Twice in his career he was put out of action, first by a lengthy illness and later by a serious motor accident. Many lesser men would have thrown in the sponge, but he came back on both occasions to play again a fully active part in the Company's business. Thus it is particularly sad that he enjoyed rather less than two years of a retirement which he had so abundantly earned. Many people both inside and outside ICI will feel privileged to have known George Hampshire and will long remember him not only for his contributions to the Company and the industry, but for personal incidents which won their gratitude and affection.



Mr. Hampshire



Dr. Taylor



Mr. Currie

Technology and Higher Education

Continued from page 123

which appears monthly and is a most professional publication. Perhaps it is even more important that, quite apart from what is organised, disorganised talk and discussion over coffee cups and mugs of beer seems to be more or less continuous.

None of this would be much good if the academic standards were not high. They are. These standards are naturally set by the teaching staff, and at the Birmingham CAT in the Chemistry Department there are four Readers doing research work in addition to their teaching and nine Research Fellows and Assistants. It is these standards of scientific research which are inculcated into the students and nothing lower will do—the fact that the basis of their studies is technological is no excuse for lowering them.

What this means in practice is that our people who go to Birmingham are getting most of the good things that they would get from one of the traditional universities, together with some good things that none of the traditional universities can offer. They are acquiring a new academic discipline, they have the opportunity to see during their periods of industrial training how this academic discipline can be applied, and they are getting some of that widening of the horizon which a true liberal education provides.

What our students have achieved is comparatively broad in its range. One of them has published, with his supervisor, a joint paper in the Transactions of the Faraday Society. Another is hoping to go on to do research at the University of East Anglia at Norwich when his course ends this year. A third is running our paint works in Nigeria, which he went out to start up soon after he was awarded his Dip. Tech. Many of them have played leading parts in the Students Guild, for which we have from time to time supplied presidents, editors of the Guild newspaper, and innovators and organisers of many of the Guild's multifarious activities.

I believe that our people who have been to the Birmingham CAT have had a university education in the fullest sense of the word, and they have emerged able and keen to apply what they have learned to the problems of industry. I believe that Paints Division, and indeed ICI in general, needs more people as highly trained as these who can and will apply their knowledge and training in technological fields rather than in the field of pure research. We are still going to want every good graduate we can get from the older universities, which always have produced men of ability trained to the highest scientific standards. But the CATs are now achieving comparable standards in their own field, and if my son wants to follow me into industry I shall say: "Why don't you try a sandwich course at a CAT?" Except that they won't be CATs any more—they will be universities. And quite right too!

Gardeners' Guide by Percy Thrower

If there is planting you wish to do during the coming autumn—and this will apply particularly to those who have a new garden—there will be plenty to choose from at the summer flower shows. The two shows to note in your diary are Shrewsbury and Southport. There are several things to bear in mind when giving your orders. Firstly, the plants and flowers you will see come from all parts of the country and some will be from the warmer and more sheltered districts. They may not, therefore, be perfectly hardy in your particular district, so it is well worth enquiring first.

Secondly, hardy perennial plants save the time and expense of planting out every spring and autumn, but choose those that will continue to provide colour for as long as possible. By choosing, say, a combination of two or three kinds which can be planted together you can have an attractive border for many weeks. I have in mind Russell lupins, which flower from May to July, interplanted with the hardy border phlox, which flower from July to September. To follow these until the late autumn there are the perennial asters, more commonly known as Michaelmas daisies. The newer varieties of all three are very charming, especially the new Michaelmas daisies, many of them not more than one or two feet high. Another point worth bearing in mind is that the taller the plants grow the more support they need, and many of the herbaceous plants which grow no more than two to two and a half feet need no supports at all. To add to the dwarf perennial asters there is the obedience plant, *Physostegia vivida*, a brilliant rose which flowers profusely during September and October; *Tradescantia*, in white, pinks, purple and blue which flower from June to September and grow no more than one and a half feet high; herbaceous veronica with long spikes of blue in July and August; and *Nepeta* or catmint for the front of the border (the variety Six Hills Giant is larger in the flower and more erect than the common catmint). Not all delphiniums grow to six or seven feet, many of the new ones grow no more than three or four feet, and all

these points are worth enquiring about when you make your purchases.

There will be roses by the thousand and many new ones; if you buy a new rose be sure that it has good foliage, flowers freely, and has a good habit generally. Those that have an award of merit or a trial ground certificate from the National Rose Society can generally be relied on.

The chrysanthemums are typical autumn flowers; the outdoor or border chrysanthemums should be at their best during September, and unless we get early frosts they will continue to flower until late October or early November. The biggest trouble I find is weather damage to the flowers. Many of the better and newer varieties have rather soft petals which are subject to bruising and marking by wind and rain. They are worth taking the trouble to protect, and greaseproof paper bags will provide a good protection for them. The bags must be large enough to allow room for the blooms to develop and should be placed over the buds just as the colour of the first few petals is showing, drawn loosely together and tied just below the bud. The plastic type of bag is not so good because it is not porous; moisture will soon condense on the inside, and this is sufficient to cause damp damage to the petals. Before putting the bags over the petals dust a little Gamma BHC into the bags to discourage earwigs.

The later shoots which arise from lower down the plants, or maybe from the base, will in the absence of frost flower later in the autumn, and it is well worth the time and trouble to tie them to the canes to prevent them being broken off by the wind. These shoots, like the earlier ones, will develop clusters of buds round the centre or terminal bud as well as side shoots at each leaf joint; the centre bud will grow and come into flower much quicker if all the side buds and side shoots are rubbed out early, and if the weather is kind you will have blooms to cut until late into the autumn.

The buds of the earliest of the indoor flowering chrysanthemums will be de-

veloping fast, and if these begin to open while they are still outside the petals will get badly marked and the blooms will be spoiled. There is very little gained by leaving the plants outside after about the first week in October, but they must be given as much fresh air as possible and kept cool in the greenhouse, otherwise there will be few, if any, of the flowers left by Christmas, and it is at this time that the flowers are most valuable. They should be clean when they go inside, and it is a wise policy to spray each plant before it goes into the greenhouse with 'Sybol' to which 'Tulisan' has been added.

Each day the plants must be looked over and the dry ones watered. Feeding with 'Solufeed' can continue weekly until the buds begin to open, but then should cease completely.

Cuttings of the geraniums, whether they are growing in the garden or flowering in the greenhouse or on the window sill, should be put in as early in September as possible, because it is only the well-rooted established plants which will come safely through the winter. The cuttings need not be more than four or five inches long, and well-matured shoots which are flowering will make the best cuttings. An open soil mixture (equal parts of soil, peat and coarse sand) makes the ideal rooting medium, and there is less likelihood of stem rot affecting the cuttings if they are put in an airy position—these are among the few cuttings which are not put in a close frame to encourage rooting. During the winter the rooted plants must be kept much drier than in spring and summer, in fact they can with advantage be left to the point of flagging before they are watered. There are more geraniums killed during the winter by overwatering than there are through lack of watering.

"PERCY THROWER," a new blush pink hybrid tea rose, named after our gardening correspondent, which was on show for the first time at the Chelsea Flower Show. The star introduction for 1964 of C. Gregory & Son of Chilwell, who have the largest rose gardens in the country, it has been awarded a National Rose Society trial ground certificate



Our man in Providence

"Hear ye! Hear ye! All true friends are invited to the Market Place to manifest their good dispositions by casting upon the fire that needless herb which has so perilled our liberty, interest and good health."

Thus the town crier addressed the residents of Providence, Rhode Island, on 2nd March 1775, and in answer to his call a sizeable crowd assembled to burn 300 lb. of tea and so express public dissatisfaction with the payment of duty on this East India Company commodity. Today, a hundred yards north of the site of that colonial tea party, stands the main office building of ICI (Organics) Inc., ICI's manufacturing subsidiary in the USA.

Heading this concern is a 51-year-old Northcountryman, Dr. Tom Richardson, a former sales director of the Dyestuffs Division. Selling chemicals to Americans will to many readers sound like the sending of coals to Newcastle. While news of American companies manufacturing in Britain is commonplace, announcements of British firms returning the compliment are still rare enough to cause a mild stir.

ICI (Organics) Inc. has existed as such for little more than a year and may be more familiar under its old name of Arnold, Hoffman & Co.—but its ancestry can be traced back to 1815, which makes it one of the oldest chemical manufacturers in America. Its business has from the start been in drugs, dyestuffs and chemicals, and it went through a number of changes of ownership before it was bought by the Arnold and Hoffman families at the turn of the century. ICI acquired a majority shareholding in 1950 and now owns over 90% of the share capital.

Dr. Richardson has been president of the company since 1961. He came to the job after more than 20 years with the Dyestuffs Division, which he joined after post-graduate research at Durham and Oxford Universities. Apart from a war-time spell with ICI (Levant) at Jaffa and Tel Aviv, he had until 1961 been based for all his ICI career on Manchester, although his work on the technical service side had taken him to many parts of the world on brief visits.

In 1958, when head of the Dyestuffs Division's Market Sales Control Department, he was appointed a UK director of Arnold Hoffman, to whom shortly after he was seconded for two years. This assignment was cut short, however, by his appointment early the following year as a sales director of the Dyestuffs Division. Two years later he crossed the Atlantic again to become president of the American company, the post he holds today.

To Dr. Richardson must go much of the credit for the present healthy state—if still modest—of the fortunes of ICI (Organics)—\$1½ million in profits last year and sales, at nearly \$14 million, the highest in the company's history. Ten years back such figures would probably have seemed Utopian, since the whole of the US dyestuffs industry was struggling in the wake of a depression caused by the loss of a considerable portion of US exports of dyestuffs and textiles. Now, however, Dr. Richardson hopes they are merely a pointer to very much better things to come.

ICI (Organics) climbed out of the doldrums thanks very largely to the introduction of the 'Procion' range of reactive dyes, a Dyestuffs Division discovery. Having such novel and outstanding dyestuffs, Dr. Richardson explains, put the company in a stronger position vis-à-vis its competitors at a very difficult time. Reactive dyes have many advantages, and, despite competition now in the reactive dyes market both from American and from European companies, progress continues to be highly satisfactory, and with 'Procilans' recently added to the selling list Dr. Richardson is confident for the future.

To the 'Procions' and to vat dyestuffs and textile auxiliaries—the original backbone of ICI (Organics)—have been added new pharmaceuticals and chemical products. Although as a Blackley man—he remains a non-executive director of the Dyestuffs Division—Dr. Richardson would be the last to belittle the importance of dyestuffs as ICI (Organics) bread and butter products, he sees the diversifying away from the strict dyestuffs business

into allied industries as the major source of progress in the future. Currently one of his main preoccupations is how to enlarge his company's foothold in chemicals for the plastics and paper industries. Progress inevitably has been, and is likely to continue, steady rather than spectacular. But extended technical service facilities, including laboratories recently opened at Charlotte in North Carolina, are already playing an important part in this, and there are plans for building further plant for pharmaceutical and fine chemicals manufacture and for plant protection products. Outside of fibres, in which ICI is in partnership with American Celanese, Dr. Richardson

would like to see his company in a position to manufacture any other new ICI developments.

The main manufacturing site of ICI (Organics) is at Dighton, Massachusetts, some eighteen miles from Providence and the company also has small manufacturing plants at Charlotte and at Cincinnati in Ohio. It employs altogether about 400 people, of whom only a handful apart from Dr. Richardson himself are British. This is deliberate policy. An ICI man from England is only considered when no one suitably qualified is readily available in the United States.

Dr. Richardson and his wife think themselves fortunate that their "exile"

from England should have landed them in such a very beautiful part of America. They live on the coast a few miles from Providence, at Barrington on the head of Naragansett Bay, and many ICI friends and colleagues have been well entertained at their home during transatlantic trips. Dr. Richardson does not consider that his habits have been greatly affected by living in the States, but he does admit to one new hobby—sailing. At Barrington they are at the centre of some of the best sailing on the eastern seaboard, and Dr. Richardson is now the owner of a 32-foot yacht. His other main recreation—a long-standing enthusiasm—is golf.

His job as head of ICI (Organics)

involves Dr. Richardson in a great deal of travelling. He makes around four trips to Britain a year, numerous visits to ICI (New York), to ICI (Organics) offices at Charlotte, Cincinnati and Atlanta, and to customers actual and potential all over the North American continent.

Being in charge of a David among the American Goliaths might deter a less equable man, but not Dr. Richardson, who remains remarkably unperturbed by the size of the present challenge and optimistic about the future role of his "little ICI" in the USA.

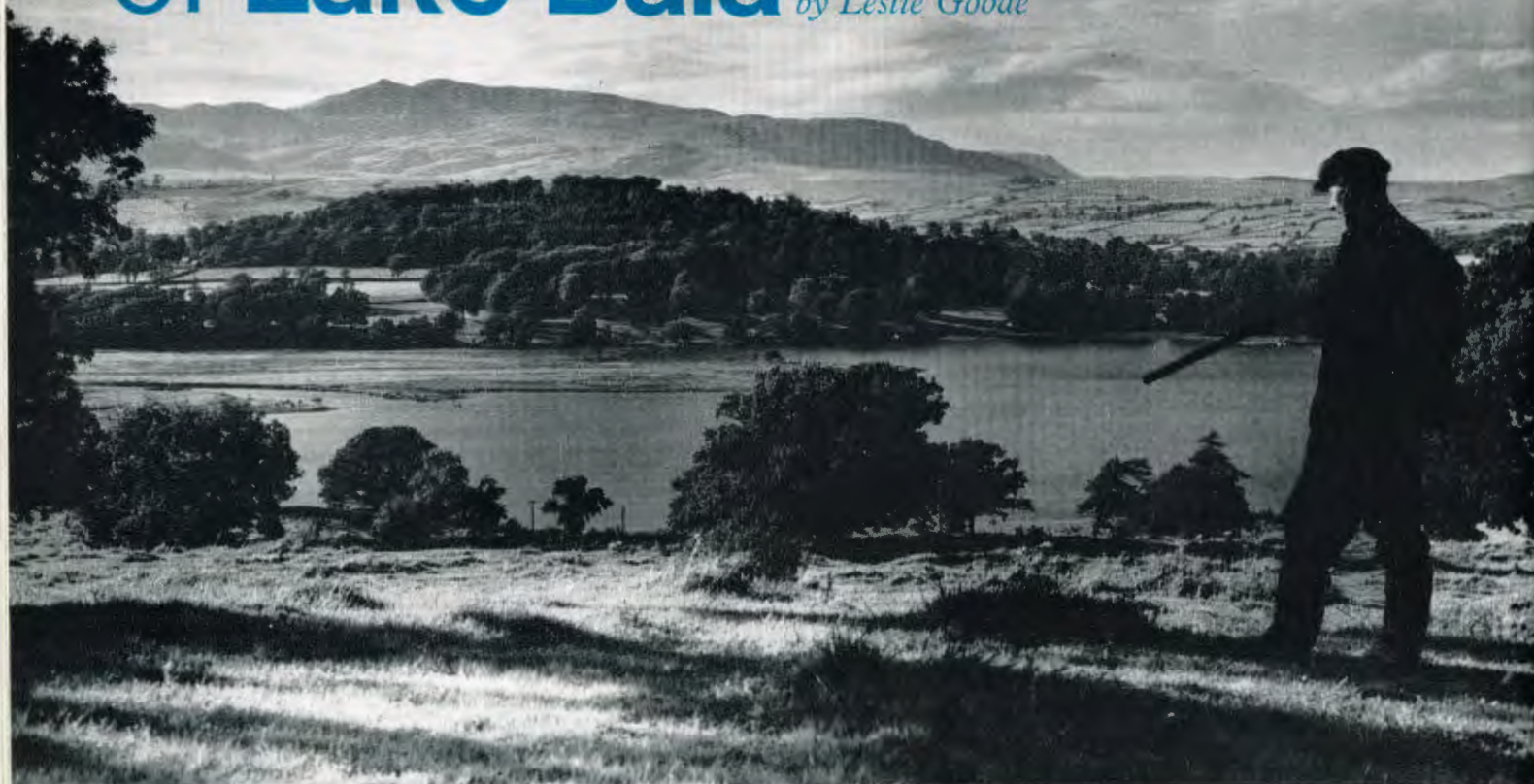
A.E.B.

photograph by Philip Jones-Griffiths



The Gwyniad of Lake Bala

by Leslie Goode



The sheep farmers knew about it. The platelayers who work on the little lakeside track knew about it. The local lads that fish, the boatmen, the visiting anglers, and of course Evans the Post—in fact everyone around Lake Bala with whom I talked fishing had heard of the Gwyniad, but none had seen one in the Lake.

As an angler my curiosity was aroused by the legend of this strange fish, a relic of the Ice Age, that thrives today deep down in Lake Bala in Merionethshire.

Lake Bala was formed some 7000 years ago as a result of glacial erosion, and it is generally accepted that it was here that the Gwyniad became isolated. They are a species of the salmon family, with larger scales than the trout and with a small, toothless or feebly toothed mouth. They are almost identical with the *powan* of Loch Lomond, the *schelly* of Ullswater and Haweswater—like Bala, these are all land-locked lakes—and with other species in North America. Most of these are restricted to lakes, but a few are migratory and descend to the sea, like salmon.

The temperatures at the bottom of Lake Bala remain fairly constant somewhere in the region of six to seven degrees centigrade, and it is here that the fish mainly live and feed. For many years now the Gwyniad has excited the curiosity of locals and anglers like myself who regularly fish in the lake. So far as I can discover, however, no angler in search of Gwyniad has yet succeeded in catching one.

My own attempts at fishing at these great depths have produced nothing more remarkable than eels, which made a mess of my light tackle. But I know now a good deal more about the Gwyniad than I did when I first tried to hook one, and for this I have to thank my friends at the Department of Zoology, Liverpool University, and not my own efforts with rod and line.

Some time ago fellow committee members of the Angling Section of the ICI Winnington Park Recreation Club, Northwich, Cheshire, suggested that I should attend a two-day coarse fishing conference at Liverpool University. It was here that I met Dr. J. W. Jones and Mr. John Haram of the Department of Zoology, who, it transpired, had shared my interest in the Gwyniad of Lake Bala for some years.

John, a fishery biologist, told me much about the fish of Lake Bala and about the new echo-sounding gear that the University have bought to help in the study of the Gwyniad. He invited me to visit him at his small lakeside laboratory. Dr. Jones had discovered that although the Gwyniad live and feed mainly deep down, they do move into shallow water at certain times of the year for breeding purposes, and spawn some time in January or February. My angler's mind noted that their closed season would be about the same time as that of the salmon.

Some time later, I was fishing at Bala (no Sunday fishing) when a shout roused me from my reverie to find the Liverpool University's motor launch, with John Haram aboard, emerging



Selective netting operations by members of the Liverpool University team from their motor launch. Inset: A Gwyniad with a scale showing size

from the early morning mist. He was spending two days there with a small team of helpers, netting Gwyniad for his research programme.

I put my tackle away and joined them to see how they used their gill nets to take the fish live in selective netting operations. John seemed to know exactly at what part of the lake the fish would be found and at what depth. As for the Gwyniad that I had found so elusive, they just gave themselves up. My first sight of them made me think how well they had been named—Gwyniad, the Welsh word for “shining.” Another remarkable thing about them was the smell, not a fishy smell but rather like that of fresh cucumber, quite pleasant.

The netting programme went on into the night, illuminated by a powerful headlamp fitted to the bows of the launch. Eventually a selection of Gwyniad was taken back to the small laboratory by the boathouse, where various tests and examinations were carried out immediately. Examination of the stomach contents revealed planktonic animals, water fleas and midge larvae.

These nettings for biological research, by the way, do not

disturb the shoals of Gwyniad. John asserted that he could go back to the same spot next day and find them just the same. He also assured me that removing Gwyniad from the lake in any quantity for experimental purposes is not likely to affect the anglers' chances of catching them, for they are quite numerous and in any case are not easily caught (he was telling me!).

The Gwyniad, I could see, has a tiny mouth for its size. A 12 oz. Gwyniad has a similar size of mouth to a 3 oz. rudd. Fully grown the Gwyniad weigh about 1 lb.

As I lay in bed that night, wondering how I could best exploit this scientific information as an angler, the prospect of success at last in my personal quest for the Gwyniad seemed to grow more and more promising. I could hardly wait for the next day to arrive. Hadn't I been shown exactly where the Gwyniad were and carefully noted the land bearings for future reference? Hadn't I been shown the correct depth too?

Off I went in my boat, brimful of confidence. Carefully I baited my small hook with some of the matter I knew the Gwyniad feed on. I waited and I waited. But still not a bite from a Gwyniad—only the odd confounded eel. And that was how it was for the rest of my fishing holiday at Bala last year; myself sitting in a boat fishing in 145 feet of water with a single maggot, and in vain.

Now my thoughts are turning again to Bala and its Gwyniad. Maybe this summer?

Pleasure in Plants

"Have you a phytopathological certificate?" asked the London Airport customs officer, grinning as he produced the long word. "No," I replied, "but here is a Ministry of Agriculture import licence." He took it, peered at the plants, peeping out of their polythene bags, which I had brought back from the mountains of Morocco, and chalked my luggage, remarking that he preferred growing chrysanthemums. The man knew his business: you are only allowed to import plants against a certificate, issued in the country of origin, stating that they are free of disease, or if you have a Ministry of Agriculture licence.

Many people, like the customs officer, prefer chrysanthemums and all the other brightly coloured, showy flowers that will turn their gardens into what the catalogues describe as a riot of colour. So do I; but I have a very warm spot for the wild plants that grow in the mountains and temperate parts of the world. These appeal to me by their individual beauty of form, which many garden plants have lost because of the nurseryman's urge, through selection and hybridising, to produce ever bigger blooms in an ever widening range of colours. They strive after pink daffodils, black tulips, yellow delphiniums, and polyanthus with pips as large as a half-crown—very praiseworthy, but rather unnatural? Anyway, I usually prefer my plants to be as nature made them. They can range from trees to the smallest bulb, such as a daffodil from Spain with a flower no bigger than your finger-nail. I like the wild peonies, with their large single flowers, so much more attractive than the blowsy doubles, and the hellebores, and the countless species of iris. And particularly the hardy bulbs: irises again, snowdrops (a good collection might contain as many as fifty different forms), crocuses (a special love), cyclamen, fritillaries, colchicums, erythroniums, and many others. And of course the alpine plants, but they are a subject on their own. Then there are the collectors' pieces—some of these are man-made—comprising rarities, oddities, and long-forgotten and almost extinct flowers that were popular



(Above) *Helleborus niger*, "Potter's Wheel." This is the largest and finest form of the Christmas Rose. Its name stems from its discovery in a cottage garden in the Potteries

(Right) *Quercus robur* "Concordia." The Golden Oak seen against a form of *Acer palmatum*. This oak, which is a form of the common English oak, is rarely seen, because it is difficult to propagate

in earlier times. I have the Old Crimson Clove carnation, which goes back to the sixteenth century, and Bat's Double Red, which was listed in 1707. One of my favourites is the Double Sweet White Rocket, now of almost fabulous rarity; it blooms throughout the summer and is heavily scented. There are many others: the hose-in-hose primroses with one flower inside another, the Mad Nut, whose twigs change direction at every inch, the Rose Plantain, like the weed but with pretty green rosettes instead of a flower-spike, the "Bloody Warrior" wall-flower, the Hen and Chickens daisy, which bears a halo of little flowers around its centre—and so on.

This sort of gardening is a twofold business. First you have to get hold of the plants and then find out how to grow them. Many can be obtained from specialised nurseries and other gardens, but far the most interesting, though not the easiest way, is to collect them where

by Eliot Hodgkin

(Left) *Paeonia mlokosewitschii*. This is a species from the Central Caucasus. It is a pity that the finder, after whom the plant is named, had an unpronounceable name
(Below) *Lilium leichtlinii*, a rare beauty from Japan



they grow wild. I have spent many holidays in the mountains of Europe collecting alpine plants, seeking out the finest forms and unusual variations in colour or shape of flower. Part of the fun, of course, is poring over maps and floras during winter evenings, finding out where some treasure grows, and calculating when it is likely to be in flower. With practice and growing knowledge, you can collect plants even when not in flower; you develop a sixth sense, so that you come to recognise the slender leaves of a crocus even in a grassy meadow.

Collecting must always be done in moderation, and sometimes not at all. Most countries in Europe rightly protect their wild plants and list those that must not be dug up. A number of rare plants have almost disappeared through the ravages of professional collectors, and of those who thoughtlessly collect in the often vain hope that what grows happily in the mountains will also flourish in their gardens at home. So never take a plant unless you know how to grow it; and never more than you really need. Plants raised from seed by nurserymen in this country are far more likely to succeed than those collected in the wild.

I have been fortunate that my work has taken me to many parts of the world, and almost everywhere there is someone who knows and loves his native flora. Language is no great barrier, as every plant bears the same Latin name everywhere; to the botanist a dandelion is *Taraxacum officinale*, whether he lives in Manchuria, Moscow or Manchester. An hour in the botanical garden at Leningrad, breakfast with an eye-specialist in Chile, dinner at a Civil servant's house in Tokyo, a Saturday with a Jesuit Father in the mountains of Lebanon—all these have brought me many good plants and many a good friend, as well as providing an insight into the manners and customs of a country, which sometimes would have been hard to gain. Political barriers vanish between people with some common interest; nowhere have I had a warmer welcome than in the botanic gardens of Moscow and Leningrad.

Some of our staff abroad have been fired with enthusiasm, and on one occasion a Main Board Director was kept

twiddling his thumbs in the car while our man in Ruritania jumped out to dig up a particular iris which I had asked him to look out for. It is now happily established, and seed of it has gone to other gardeners here and overseas.

One spring morning I was shown round a large shrub nursery in Holland by the owner. Whenever I admired anything, he would hunt for a small specimen and yank it up from the sandy soil without any tool. Soon I had a nice little collection of shrubs to take home, but unfortunately I had for once no import licence with me.

Rheum emodi. This wild rhubarb could be eaten, but it is grown for the beauty of its flowers and leaves, which are purple on the underside



Tulipa vvedenskyi, a wild tulip from Russia, shown flowering for the first time in England

What to do? I went to a flower shop, bought sheaves of daffodils and tulips, and had them made up into a splendid bouquet with my shrubs as greenery. Everyone on the plane was bringing home cut flowers, and I sailed through the Customs with no questions asked. Still, I would not recommend this method; it might not work again.

If anyone gets a rare or difficult plant, he will usually distribute it among his friends. This is not only done out of kindness; others may be more successful growers, so if you lose yours you may get it back again. Collecting plants has this great advantage over other forms of collecting: you can usually multiply your specimens by propagation.

Although all but the most inaccessible parts of the world have been scoured by botanists and plant hunters, it is still possible to find new plants even in Europe. A Greek lawyer friend of mine took up botanising on his retirement and was soon turning in new species to Kew for naming. I had high hopes of him as a source, but as a true botanist a plant only interested him when it was dead and pressed. However, by poking about in his small backyard in Athens where he had casually planted some of his finds I managed to rescue a crocus and tulip, both of them new to science and cultivation.

Many of the plants I get from abroad are

Iris iberica, a dwarf iris from the mountains of Persia

bulbs, simply because they are much easier to transport and can be moved even in bloom. On arrival they are planted in pots or boxes, usually in a mixture of half peat and half sand, until the foliage dies down. As nearly all come from countries with more sun than we enjoy, they must be kept dry in summer and given as much baking as our climate allows. In autumn they are planted out, or potted up if they are to spend the winter in a frame.

The next best thing to going abroad is to visit other people's gardens. This is the way to learn what the plants look like and how they are grown. Good gardeners like showing off their gardens to those who share their interest. And they are a generous race; there are always bits and

pieces going begging and a pinch of seed to be had for the asking. If someone comes to see the garden and goes away without a plant or a snippet, I feel there is something wrong with the garden. Or the man isn't a true gardener. Many of my best plants have come to me through the kindness of friends.

Finally, a propaganda footnote. Anyone who feels moved to try and grow something out of the usual run should join the Alpine Garden Society, 58 Denison House, 296 Vauxhall Bridge Road, London, S.W.1. The annual subscription is only £1, for which among other things you get a quarterly illustrated bulletin and one of the best seed lists in the world to choose from—free!



THE PUNCH AND JUDY MAN by E. Evans (*Economics and Statistics Dept.*)

